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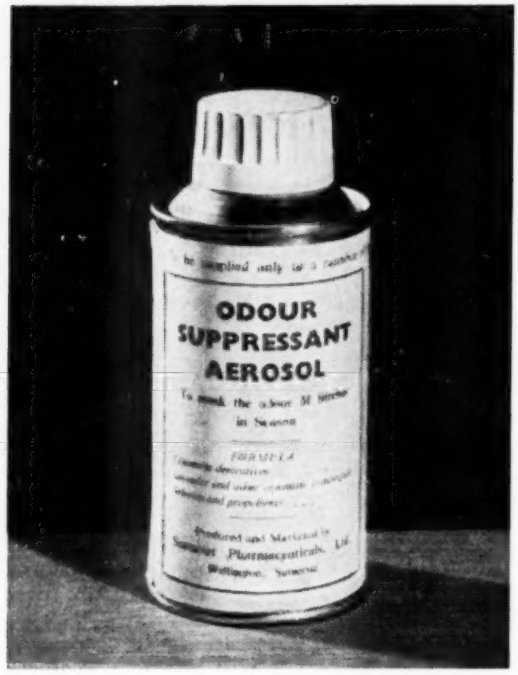

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No. 33 OCTOBER 3rd, 1959 Vol. 71

Registered for Transmission as a Newspaper *Price 2s. post free*

Osteochondritis of the Hip of the Dog—With a Note on the Use of Prostheses in Treatment*

BY

CHURCHILL FROST
Royal Veterinary College, London

OSTEOCHONDRITIS of the proximal femoral epiphysis is a disease of the young dog, the symptoms developing from between 4 to 9 months of age approximately. The disease is essentially a softening of the femoral head but the cause is unknown. Local disturbance of the blood supply is believed to be an important factor. Apparently, in early life at any rate, the blood vessels of the round ligament are necessary for the nutrition of the femoral epiphysis. Trauma may play a part. The disease is seen in small and medium sized breeds, and very rarely in larger ones.

Clinical Symptoms

Lameness develops in a period of days or perhaps weeks. Both hips can be affected, but very much more commonly it is only one. The limb is shortened and the trochanter becomes prominent, pain on manipulation is usual and hip movements are noticeably limited by comparison with the normal. In some cases the limb is only used occasionally or carried continuously for long periods.

Radiographic Examination

This should be in the ventro-dorsal or dorso-ventral plane under general anaesthesia with both limbs extended backwards. Except in the mildest cases it will be noticed that the affected limb cannot be extended backwards as far as the unaffected limb. The essential features are shrunken deformity of the epiphysis, flattening, patchy irregularity in density suggesting fragmentation, thickening of the femoral neck, and hypertrophy of the acetabular rim to deepen the acetabulum (see Figs. 1, 2, and 3).

* Paper presented to a joint meeting of the Central Veterinary Society and the South-east Metropolitan Orthopaedic Club on April 2nd, 1959.

Course

Experience has shown that quite a high proportion of puppies with hip osteochondritis regain almost, if not full, function of the limb in 6 to 8 months after the onset of lameness. Radiographic evidence can be provided of the ability of the epiphysis to regenerate to an appreciable extent. In the dog the protective function of pain is almost all that can be expected to relieve stress on the epiphysis. Some degree of osteoarthritis may complicate recovery and there are instances in which permanent lameness results.

Treatment

There is no medical treatment that appears to influence the course of the condition. Mineral salts and vitamin A and D may help in epiphyseal regeneration but there is no definite evidence. Such substances in therapeutic dosage can do no harm.

In some cases the possibility of practical arthroplastic surgery has been considered and one, so far, satisfactory replacement of the femur head in a case of osteochondritis coxa is recorded.

Case History

The subject, a miniature poodle dog aged 18 months, with a history of lameness on the right hind leg for 9 months, was examined and found to have a comparatively prominent great trochanter, some discomfort on manipulation of the hip joint and evident shortness in the length of the leg, all these signs being characteristic of osteochondritis coxa. X-ray examination showed resorption and deformity of the femoral head and hypertrophy of the acetabular margin. In the circumstances, prognosis was thought to be unfavourable but it was arranged there should be re-examination in a month. At this second

examination no improvement in the function of the leg could be detected and it was decided to design a femoral head prosthesis. Its preparation was expected to take a few weeks and the replacement operation was planned to take place as soon as the prosthesis became available, providing the lameness had not improved by that time.

From the X-ray appearances of the normal left femoral head, a drawing was made of a ball head prosthesis having an hexagonal base with a central tapping for a securing stem screw. This screw was to be of sufficient length to transfix the femur from a point below the great trochanter at an angle of about 45° with the long axis of the bone and so maintain the prosthesis in the appropriate position.

The screw and prosthesis were to be of non-toxic stainless steel and a set spanner provided to fit the hexagonal base in order to prevent rotation while the screw was tightened. Without damaging the polished articular surface, no simple means of holding the prosthesis could be conceived other than by the provision of some non-articular area for the purpose.

The third examination of the dog was made about one month after the second examination and there was no appreciable change in the use of the right hind leg. By this time the prosthesis had been received and an operation was arranged.

The Operation

The hip joint was approached by amputation of the great trochanter and the femoral head amputated in the plane of the metaphysis. The prosthesis was inserted and the great trochanter replaced and retained in position with a strand of 30-S.W.G. braided stainless steel. Three-and-a-half years after the operation the dog is quite sound.

References

FROST, C., & KNIGHT, G. C. (1955). *Brit. vet. J.* **112**. 2.
———. & ———. (1958). *Ibid.* **114**. 142.

U.S. MARKET STUDY PROJECT

Three representatives of the compound animal feeding-stuffs industry are members of a British team visiting the United States this autumn on a market study project organised by the U.S. Department of Agriculture.

The team, which left for the United States on October 2nd, is expected to be away for about 3 weeks and will study American feed production and utilisation methods by visits to farms, feed processing plants and to important areas of livestock and poultry production.

One of the representatives is Mr. W. W. C. Gibson, B.SC., M.R.C.V.S., chief technical adviser to R. & W. Paul Ltd., Ipswich, who is a member of the Scientific Committee of the Compound Animal Feeding-stuffs Manufacturers Association.

Meningo-encephalitis eosinophilica of Pigs

BY

R. RAC

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Adelaide, S.A.
Australia

SUMMARY.—Two outbreaks of salt poisoning in pigs resulting from the feeding of contaminated whey are described. The results of clinical, post mortem, *bacteriological, histopathological, and biochemical examinations are presented including the histopathology of a recovered pig. The need to prevent salt contamination of whey intended for feeding is discussed. This is likely to arise where there is good recoverable value in the butterfat in vat and press drainings. It is considered impracticable to make available additional drinking water where pigs are being encouraged to drink maximum amounts of whey.*

Introduction

THIS paper records, so far as we can ascertain, the first confirmed case of meningo-encephalitis eosinophilica in which whey has been recorded as the causative agent. Previous recorded cases have been due to brine, fish meal and other meals containing excess sodium chloride.

Under certain circumstances, the presence of sodium chloride in pig rations can be dangerous (Bohosiewicz, 1953; Bohstedt & Grummer, 1954; Done, Brooksbank & Buntain, 1957; Smith, 1957; and Done, Harding & Lloyd, 1959). The most common circumstance is when water intake is restricted. However, according to Done, Harding and Lloyd (1959) experimental pigs tolerated up to 3 per cent. of sodium chloride with a restricted water intake.

In the outbreaks of salt poisoning described here, fluid intake was unrestricted as the pigs were provided with all the whey they would drink. It is the practice that where "maximum" whey feeding is carried out, no other source of water is available.

First Outbreak

A piggery reported one morning that 7 pigs had been found dead and that a further 6 were sick. Clinically, the most constant feature was epileptiform convulsions. These became more frequent as the condition progressed. After a convulsion the animal would be exhausted for a while: on getting up it showed ataxia, and wandered about bumping into objects. The pigs appeared to be blind, no eye preservation reflex was present and the pupils were dilated. There was champing of the jaws and profuse salivation. Other symptoms occasionally

* Present address: Department of Zoology, University of Adelaide.

CHURCHILL FROST—OSTEOCHONDRITIS OF THE HIP OF THE DOG

FIG. 1.—Pekingese. Male. 7 months. Osteochondritis right hip.

FIG. 2.—Pekingese. Female 10 months. Osteochondritis left hip showing absorption of the femoral head.

FIG. 3.—Yorkshire terrier. Male 8 months. Bilateral coxal osteochondritis.

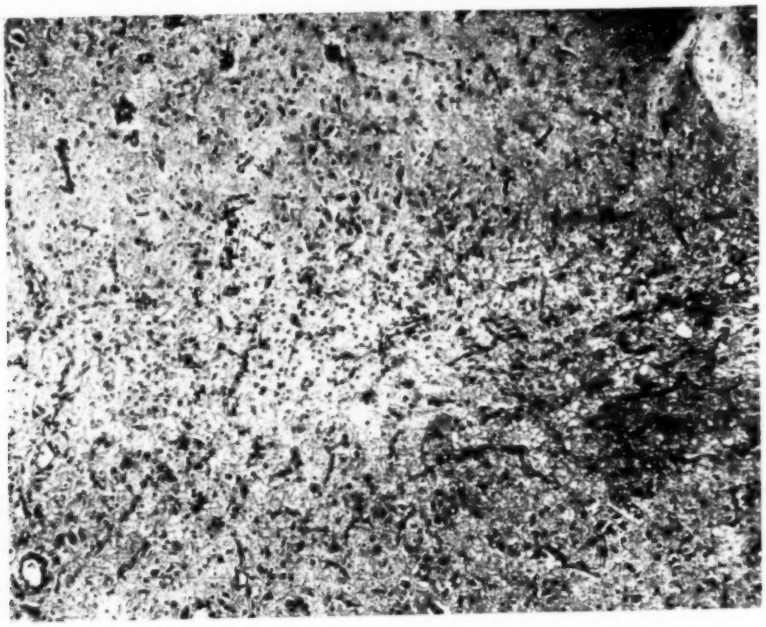
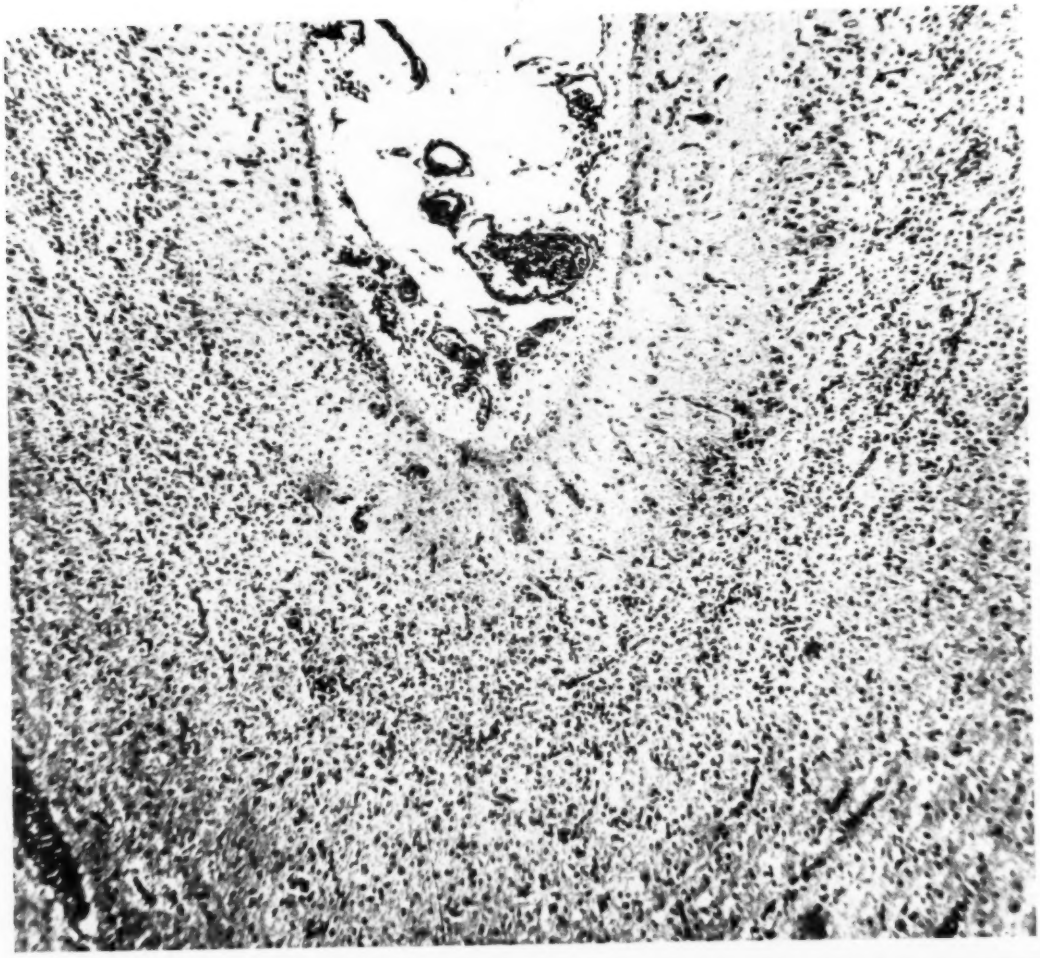


FIG. 3



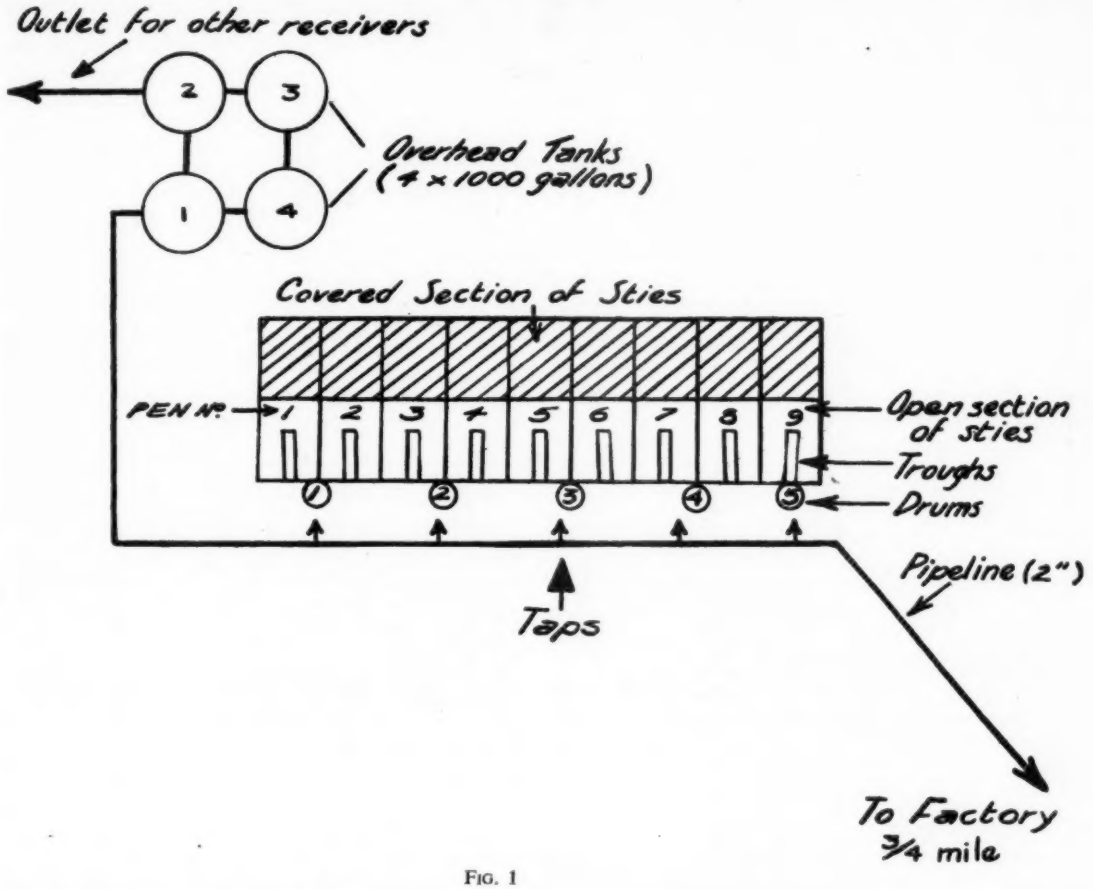


FIG. 1

present included circling, trying to climb the wall of the pigsty and rubbing the nose till it was raw and bleeding.

Out of a total of 27 deaths, 25 pigs were weaners, all of which came from pens 7 and 8 (see Fig. 1).

In addition to the whey, variable amounts of crushed wheat and barley were fed. The whey was produced in the neighbouring cheese factory three-quarters of a mile away and was piped to the piggery.

During cheese manufacture salt is added to the curd after the first fraction A (Table I) of the whey has been drawn off. Until May, 1957, the whey containing salt, that is fractions B and C, were being discarded, but it was then realised that butter fat in these two fractions was worth recovering. To recover this butter fat fractions B and C were put through the whey separator the following day after having been mixed with the first 200 gallons of that day's whey. The mixture was immediately piped to the

TABLE I—MAIN OPERATIONS IN CHEDDAR CHEESE MAKING

	Whey fraction	B.F. per cent.	NaCl per cent.	Whey from 7,000 gal. of milk, gal.	Percentage of total whey
SETTING ↓ CUTTING ↓ HEATING ↓ → Drawing of whey from vats	A	0·23–9 0·37	0·18–0·23	5,950	>99
↓ CEDDERING ↓ MILLING AND SALTING → Drainage of whey from vats	B	7–22	23·8	30	< 1
	C	7–17	11·0	20	
↓ PRESSING → Whey pressed out ↓ CURING			Total	6,000	100

Salt is added at rate of approximately 3 lb. per 1,000 lb. of milk (210 lb. in 7,000 gal.) of which approximately 50 per cent. is recovered in whey fractions B and C.

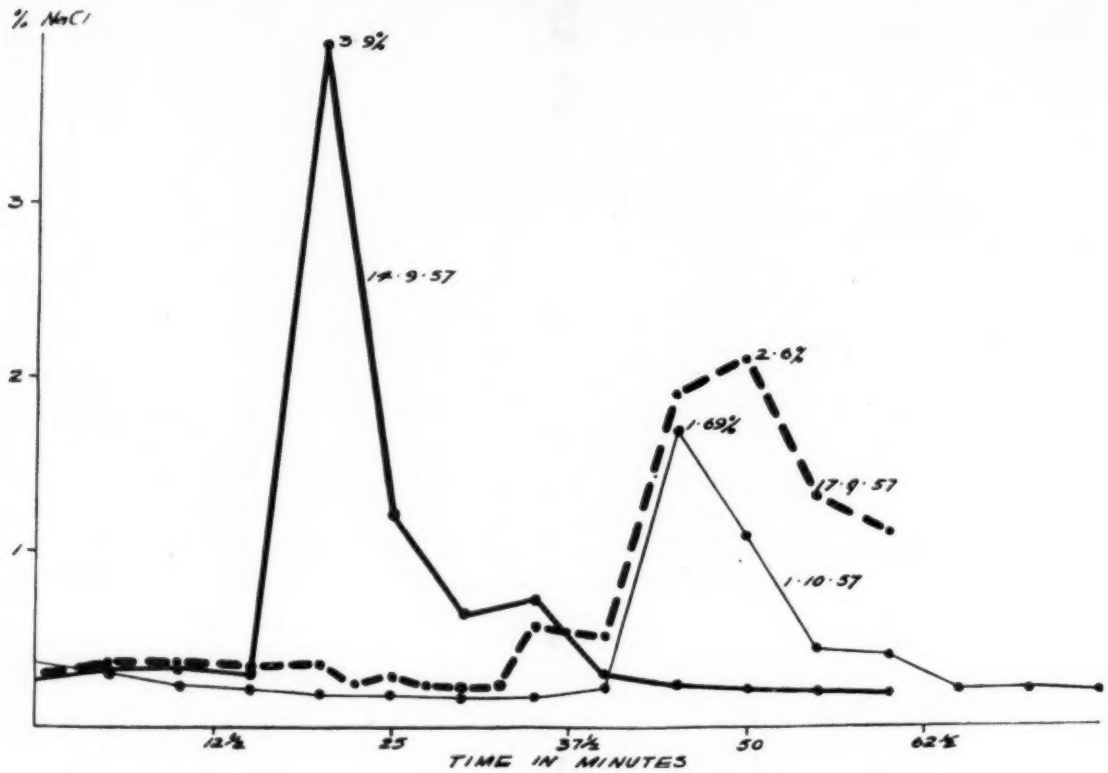


FIG. 2

piggery. Each day the first whey to reach the piggery consisted of 450 gallons of fraction A which had remained in the pipeline overnight, followed after approximately 15 minutes by the mixed whey containing fractions B and C of the previous day with the higher percentage of salt. Thus approximately 20 minutes after the day's delivery had commenced, there was a sharp peak in the salt content as shown for September 14th, 1957, in Fig. 2.

The owner of the piggery was not aware of this change in the whey, and continued his set feeding routine.

Whey feeding started each day at midday, which was shortly after pumping started, and was carried out by filling both the drum and the trough together in order from No. 1 to No. 5 (see Fig. 1). The troughs were filled for the midday feed and the drums were left filled for the evening feed. Thus, similar whey was used for both midday and evening feeds. There was also a tendency for certain drums to be filled with the same fraction of each day's whey. The remainder of the whey was pumped into 4 by 1,000 gallon overhead tanks. The morning feed of whey was drawn from these overhead tanks.

As stated earlier the affected pigs were in pens 7 and 8, which suggests that these pens received more salt than the others (Table II). Presumably the high salt peaks usually occurred at the time when these pens were being fed. The fatalities are also thought to be related to the younger age of the pigs in these pens.

This particular piggery used the first 1,000 gallons, the remaining 5,000 gallons being collected for local piggeries, between noon and 4.30 p.m. The first 1,000 gallons would on most occasions have contained all the salty whey, explaining why no trouble was experienced from other piggeries getting whey frome these tanks.

Our first suggestion to overcome this problem was for the factory to mix the salty fractions B and C with a greater volume of fresh whey and to pump it to the piggery later in the day. The result of this is shown in Fig. 2 (curves for September 17th, 1957, and October 1st, 1957). However, it was pointed out that the whey in the overhead tanks was now potentially dangerous, and it would be advisable for people collecting it to call as late in the day as possible because this would allow for considerable dilution of the whey. That this was sound advice was forcibly

TABLE II—PERCENTAGE NaCl IN WHEY IN DRUMS

14.9.57	Midday	P.M.	A.M.
Drum 1	0·32		0·34
,, 2	0·34	Not	0·35
,, 3	0·29	taken	0·34
,, 4	3·05		0·34
,, 5	0·96		0·35

demonstrated when a second outbreak occurred 4 months later in a neighbouring piggery which drew whey from these overhead tanks.

Second Outbreak

It was necessary one Saturday to collect whey earlier than had been recommended and apparently the 800 gallons collected must have contained an excessively high amount of the salty whey. 200 pigs of mixed ages were fed this whey. All the food was eaten and the pigs were fed again on Sunday night.

The first symptoms of poisoning were seen on Monday morning. The whey and barley had not been eaten and the pigs did not come up to the troughs looking for food. The symptoms included staggering, heads held high, and attempts to climb the pigsty walls; some pigs were vomiting. The animals most affected were a recently weaned litter and a sow. The sow was found lying down comatose.

Ten animals died and another 10 had to be destroyed while the remainder did not come back onto their feed properly for 2 weeks.

Perhaps the greatest economic loss was the lost production as growing pigs failed to thrive for a considerable time. Unthrifty pigs were still apparent 2 months later. Some were seen with unsteady stilted gaits while a few walked aimlessly about.

Investigation

Animals from both outbreaks which had shown typical symptoms were submitted to a full *post-mortem* examination. All carcases were in good condition. The mascrocopic lesions seen at autopsy were non-specific. Some pigs had slight inflammation of the fundus of the stomach, while others had some inflammation of the small intestine.

Culture of the brain and various other organs prepared aerobically, anaerobically and under CO_2 were negative, as were biological tests carried out on laboratory animals.

Microscopical examination of muscles and internal organs revealed no marked abnormalities except for the brain where histopathological examination of the grey matter anterior to the corpora quadrigemina showed the most striking infiltration by eosinophils in the subarachnoid space, particularly in the depth of sulci and along the pial sheath of the vessels. This eosinophilia produced dense perivascular cuffing, often with several layers of eosinophils, within the cerebral cortex. Occasionally a few eosinophils were seen scattered in other parts of the grey matter, and particularly in the vicinity of blood vessels. This infiltration was confined to the grey matter.

Many affected blood vessels showed proliferation of the endothelial cells, the nuclei appearing swollen and vesicular. A few round cells were also seen in the perivascular space of some of the blood vessels. All these microscopic lesions were present with varying degrees of intensity in every case.

Widespread fine vacuolisation occurred throughout the grey matter and in some areas this had become confluent to form cystic spaces causing small areas of cerebral softening. Many neurones showed degenerative changes, pyramidal cells having become shrunken and pyknotic, sometimes being forced into the shape of a crescent at the side of the vacuole. Severe vacuolisation was most evident in the 3rd, 4th and 6th laminae of the cortex, and rarely extended into the molecular layer. When severe vacuolisation was evident in the 6th lamina the white matter was usually involved. This was particularly so where the gyri were narrow. In such areas, Virchow-Robin spaces were greatly dilated.

The lesions were distributed throughout the whole of the grey matter of the cortex but were particularly present in the walls of the cortical culci. It was noticed, however, that in cases with pronounced eosinophilia vacuolisation was slight, whereas in other pigs with minimal eosinophilia vacuolisation was very noticeable.

The rest of the brain tissue, including the grey nuclei, appeared quite normal. These changes are identical with those described by Smith (1957) from experimental salt poisoning in pigs.

We examined several pigs which had recovered from the clinical symptoms. There was complete disappearance of the eosinophils. Where vacuolisation had occurred the process of repair had commenced. The affected areas contained many cells of which the majority were astrocytes. Several neurones showed signs of recovery and some new blood capillaries were also seen, while the presence of compound granular corpuscles suggested the ingestion of products of degeneration of nerve tissue.

Proliferation of a cellular vascular tissue was most obvious in the 6th layer and extended towards the surface of the cortex, being most extensive in those areas which had shown the most severe vacuolisation. Although this tissue did not react to the P.T.A. stain usually used for the demonstration of glial fibres, this might be due to its very early and rather primitive nature (Figs. 3 and 4).

Some blood vesels both in the meninges and also

(*Continued overleaf*)

TABLE III

Pen	Number of pigs	Sodium mg. per 100 Ml serum	Chloride mg. per 100 Ml serum	Total protein by S.C. g. per 100 Ml serum
A	1 affected	384·1	378·0	6·1
	1 recovered	368·0	378·0	6·1
	3 apparently normal	361·1–361·1–361·1	378·0–381·5–395·5	6·0–6·1–6·5
B	10	328·9–345·0 (average 337·4)	350·0–385·0 (average 373·4)	5·6–6·9 (average 6·4)

A = Affected pen. B = Non-affected pen.

Refresher Article No. 16

Enterotoxaemia

BY

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Veterinary Investigation Centre, Cambridge

England

Introduction

THIS paper deals primarily with enterotoxaemia of sheep associated with *Clostridium welchii* type D. *Cl. welchii* type C. infection in sheep is mentioned in the differential diagnosis but it is considered to be relatively rare. The term enterotoxaemia refers to the condition commonly known synonymously as pulpy kidney disease, but this name is not used in the paper because it is considered to be misleading.

The condition is one of the most prevalent killing diseases of sheep and is particularly important because it strikes the best sheep so rapidly that treatment is rarely possible. The incidence is greatest in lowland flocks particularly when intensive methods of grass production are practised and the incidence may, therefore, rise if grassland management continues to improve.

Nature and Cause

Bennetts (1932) showed that enterotoxaemia was due to the absorption of the epsilon toxin of *Cl. welchii* type D from the intestinal contents. He successfully reproduced the disease in 4 of 6 sheep by using opium and belladonna to slow down the intestinal movements before dosing with toxin. However, it was subsequently shown by Bullen, Scarisbrick and Maddock (1953) that large single doses of toxin did not necessarily kill normal sheep.

It was suggested by Gill (1929) and Oxer (1932) that *Cl. welchii* might well be a normal inhabitant of the intestines requiring certain environmental changes for its rapid multiplication. The first part of this theory has been confirmed by several investigations, but particularly by those of Bullen (1952) where the organism was found in 46 of 100 normal sheep examined at a Cambridge slaughterhouse.

Meningo-encephalitis eosinophilica of Pigs—*Concluded.*

in the cortex showed cuffing with round cells. Foci of round cells were scattered in the cortex.

Blood samples from one affected pig, one recovered pig and 3 apparently normal pigs from the affected pen were taken for analysis of sodium, chloride and protein, while 10 blood samples were taken from normal pigs in an unaffected pen.

There was no variation between normal and affected pigs in protein or chloride but the sodium ion was higher in pigs from the affected pen than from the non-affected pen. Within the affected pen there was a variation between clinically normal pigs, recovered and affected pigs (Table III).

Discussion

The results of serum examinations do not entirely agree with those of Smith (1957) and Done *et al.* (1959), as they also found an increase in the chloride content. In our case the sodium concentration alone increased. According to Wesson and Anslow (1948), during osmotic diuresis in the dog, sodium, chloride and water are not reabsorbed in a constant ratio as diuresis increases. In their experiments, even at the highest urine flow, only 26 per cent. of the filtered sodium was finally excreted as compared to 33 per cent. of the filtered chloride. This may explain the increase in sodium ions in the serum without an equal rise of chloride ions.

This rise in Na^+ was apparently sufficient to cause the damage to the brain and as the serum protein remained normal, there was no definite evidence of water imbalance playing any part in the aetiology as suggested by Done *et al.* (1959).

Whenever whey is intended for pig feeding every precaution should be taken to prevent salt contamination occurring. Where the butterfat in fractions B and C is considered worth recovering, separating arrangements much be such as to keep it apart from any whey intended for pig feeding.

In relation to "maximum" whey feeding it is not possible to carry out the recommendation of Done *et al.* (1959) that unrestricted water should always be available. Water is not provided as it is desirable for economic feed purposes to encourage the pigs to drink as much whey as possible.

Acknowledgments.—We gratefully acknowledge assistance given by the owners of two properties, the factory manager, the South Australian Department of Chemistry and the Dairy Branch of South Australian Department of Agriculture.

References

BOHOSIEWICZ, M. (1953). *Med. vet., Varsovie.* **11.** 498.
BOHSTEDT, G., & GRUMMER, R. H. (1954). *J. Animal Sci.* **13.** 933.
DONE, J. T., BROOKSBANK, N. H., & BUNTAIN, D. (1957). *Vet. Rec.* **69.** 67.
———, HARDING, J. D. J., & LLOYD, M. K. (1959). *Ibid.* **71.** 92.
SMITH, D. L. T. (1957). *Am. J. Vet. Res.* **18.** 825.
WESSON, L. J., Jun., & ANSLOW, W. P., Jun. (1948). *Am. J. Physiol.* **153.** 465.

Bullen and his colleagues then went on to investigate experimentally the factors which would lead from the organism's harmless existence in the intestine to its production of clinical disease. Bullen and Batty (1957) showed that the permeability of sheep intestine was increased by the prolonged presence of high concentrations of epsilon toxin so that while the normal permeability of the intestine may allow slow toxin absorption and production of immunity, sudden high and prolonged concentrations of toxin may lead to increased permeability and fatal absorption. Bullen and Scarisbrick (1957) found that the principle factor leading to the high concentration of toxin was the presence of undigested or partly digested food in the intestines; hence the association of the disease with overeating and sudden changes in diet. These experiments went a long way towards explaining not only the production of the disease but its sporadic nature and the existence of natural immunity in a large proportion of sheep.

To summarise and perhaps oversimplify, the important factors for the production of enterotoxaemia would appear to be:—

1. *Cl. welchii* must be present in the intestines.
2. The environment there must favour intensive and prolonged production of epsilon toxin.
3. Such an environment can be provided by excess partly digested food such as occurs with greedy feeders and/or after a sudden change of food.
4. There must be a lack of natural or artificial immunity.

Clinical appearance

Enterotoxaemia can affect all ages and all breeds of sheep at any time of the year, but the author has never confirmed the disease in lambs less than 2 weeks old. Affected sheep are nearly always in thriving condition. The association with overeating and sudden food changes tends to make the disease more common in spring, March and April, and autumn, October and November. The spring peak is associated with the new growth of grass and affects good ewes and young fat thriving lambs about 6 to 10 weeks old. The autumn peak frequently involves ewes flushed for tupping, hill ewes brought to lowland grazing, or feeding sheep put on to arable crops.

Preliminary signs are seldom seen, the animals are just found dead. A chronic form of the disease has been reported in America, and some practitioners believe cases occur here; a view expressed by several speakers in the discussion of a paper on enterotoxaemia by Montgomerie and Thomson at the B.V.A. Congress in 1954. On theoretical grounds such an entity would be expected to exist but there is no conclusive evidence available at present.

It is unusual for more than 5 per cent. of a flock to be affected at any one time but losses are nearly always in the best sheep and may continue for several weeks.

Diagnosis

General

Perhaps there is no other common disease which presents so many difficulties in accurate diagnosis. The main sources of confusion may be enumerated as follows:—

1. Sudden death prevents the observation of any clinical signs.
2. Other diseases can, and often do, exist at the same time in the same flock. In particular hypomagnesaemia can occur under similar circumstances and produces similar *post-mortem* findings.
3. *Post-mortem* decomposition is rapid and there are no conclusive pathognomic lesions.
4. Laboratory tests, though helpful, are unreliable when taken independently and can give both false positive and false negative results as will be explained later.

Consequently it is essential to consider all the available flock history and to equate it with *post-mortem* and laboratory findings before making a diagnosis.

Points of particular importance to be assessed by the practitioner in the field are the general condition of the flock (rarely do unthrifty sheep succumb to enterotoxaemia), the type of pasture (the sheep will be thriving better on good grass), recent changes in feeding, the provision of mineral supplements (differential diagnosis of hypomagnesaemia), and vaccination history. In practice the difficulties of rapid and accurate diagnosis are such that the sudden deaths of several unvaccinated and thriving sheep with suspicious *post-mortem* findings warrant the immediate use of vaccine and/or serum.

Post-mortem *findings*

Again, general considerations should not be forgotten. An unthrifty sheep is unlikely to have died of enterotoxaemia. The length of time since death, and the temperature at the time of the year will influence the appearance of the carcase. The degenerative changes in the kidneys which give the disease its popular name can occur in any carcase 24 hours after death and by contrast the kidneys of sheep dead of enterotoxaemia may remain firm for 3 or 4 hours. Firm kidneys in a carcase 10 hours dead contra indicate the disease though in the author's experience lambs show pulpy kidneys less frequently than older sheep. The most convincing kidney lesion is a gross general softening, with large diffuse surface haemorrhages and extensive distention of the capsule by gas in a sheep dead less than 24 hours.

Lesions are constantly found in the heart. In lambs in particular there is an excessive amount of gelatinous pericardial fluid, whilst in nearly all cases there are some haemorrhagic splashes which may be very marked on either the epicardium or endocardium. There are other general signs, particularly fatty degeneration in the liver and severe congestion in the lungs. The appearance of the intestines is not very helpful. Often they are pale and distended with gas, but rarely is there any inflammation.

The technique of collection of samples for laboratory tests is important. If a whole carcase cannot

be sent to the laboratory shortly after death it is better and more convenient to remove about 30 ccs. of intestinal contents to a glass container than to attempt to despatch whole intestines. One action of the toxin is to increase the permeability of the intestinal wall which allows the escape of the toxin and hampers diagnosis. No preservative is necessary or desirable. Toxin can be present in the abomasum, large or small intestine. It is best to select any portion of the intestine which shows even slight inflammation or flaccidity, but the ileum usually provides the best material. Quite frequently the only contents are thick and mucoid and it is not often possible to demonstrate a toxin in such material, probably because it has already been absorbed. Kidneys alone are of little diagnostic value.

Laboratory Aids

There are several laboratory tests which can give support to the diagnosis but it cannot be emphasised too strongly that their results must always be considered in conjunction with the other evidence.

(a) *Mouse toxicity tests.* Direct biological examination for toxin would appear to be the method of choice but there are many disadvantages. Only a very small quantity (about 1 ml.) of the intestinal contents can be used and it has either to be selected at random or diluted out by the rest of the intestinal contents. The toxin may have been absorbed through the intestinal wall before the examination commenced. Other toxic substances such as medicines may be present in the intestines and may kill the mice. It is not pleasant to use mice for painful lethal tests and the cost of the 4 mice used per sheep is about 7/6d at present. The detection of toxin in the intestines is not conclusive evidence of a death due to enterotoxaemia since experiments have shown immune sheep to be capable of withstanding large quantities of such toxin. However, in spite of all these disadvantages the biological test remains the best at our disposal and the method used by the author is as follows:—

About 30 ccs. of contents is centrifuged for 30 minutes at 3,000 r.p.m. A small piece of absorbent cotton wool is placed at the bottom of the tube to help clarification. If the contents are very thick it is necessary to dilute 1 in 2 with normal saline solution. It is not essential to prepare a bacteria-free filtrate by Seitz filtration because, surprisingly, mice rarely succumb to intravenous injections of unfiltered material unless a preformed toxin is present. The supernatant fluid is removed and a portion mixed with a commercial preparation of *Cl. welchii* type D diagnostic anti-serum in the proportion of 3 to 1 and allowed to stand for half an hour at room temperature. Two mice are slowly injected intravenously with 0.3 mls. each of the supernatant fluid and two receive 0.4 mls. of the fluid plus serum. It greatly facilitates intravenous injection into mice tail veins if the mice are warmed previously in a hot room or a box near a radiator. Xylol, which is painfully irritant, should not be used for raising tail veins.

Deaths which occur within 5 minutes of injection are usually due to non-specific causes such as air embolism, shock, or residual medicines in the intestines. Epsilon toxin usually kills in 1 to 10 hours but mice are observed for 3 days. It should be remembered that the concentration of toxin present in intestinal contents is completely unknown and the proportion of anti-toxin used is, therefore, quite arbitrary. The deaths of all 4 mice might indicate a very lethal toxin requiring more anti-serum for neutralisation.

Epsilon toxin requires the presence of trypsin for its activation and the treatment of intestinal contents by trypsin may, therefore, disclose previously inactive Epsilon toxin. It may be argued that all active toxin has been absorbed to cause the death of the sheep and this residual inactivated toxin is, therefore, still significant. The author does not, however, think that the procedure is necessary or desirable in the majority of cases.

(b) *The detection of* Cl. welchii *in intestinal contents.* Since it has been shown that as many as 46 per cent. of all sheep may harbour *Cl. welchii* type D in the intestines, these methods also have severe limitations. However, their simplicity makes them worthy of consideration and in the opinion of the author they give valuable additional circumstantial evidence.

A loopful of intestinal contents is smeared for direct microscopic examination after staining by Gram, and a second loopful is plated on to 5 per cent. sheep blood agar and incubated anaerobically for 24 hours.

Although organisms resembling *Cl. welchii* are nearly always present, their abundance and comparative purity in cases of suspected enterotoxaemia is most marked. The organisms seen may not all, of course, be *Cl. welchii* type D, but the full identification of anaerobes is such a prolonged and tedious procedure that it is unlikely to be of practical diagnostic value.

(c) *The detection of glucose in the urine.* A number of workers have considered the presence of readily detectable glucose in the urine to be supporting evidence of enterotoxaemia. Certainly in the author's experience there has been good correlation but it has only been possible to collect sufficient urine for a test from half the carcases examined during the last 2 years.

(d) *Gel Diffusion Precipitin Test.* Recently many workers have tried to use this test in the hope that it will provide an accurate and acceptable substitute for the use of mice. Unfortunately, the results even using pure *Cl. welchii* toxin have been very irregular and this is even more the case when the gel test using intestinal contents has been compared with biological tests in mice. Further trials are warranted but the tests are not of practical value at present.

Differential Diagnosis

It will be appreciated from all that has been said of the difficulties of diagnosis that it is most important to consider the other most likely causes of death.

Hypomagnesaemia warrants first attention because it is so easily confused with enterotoxaemia. Although deaths from hypomagnesaemia are also sudden an observant shepherd will often have noticed a period of staggering, inco-ordination, muscle twitching, paddling and/or teeth grinding for a few hours before death. Similar, but less pronounced, signs may also be observed in the rest of the flock. The availability of a mineral supplement does not necessarily exclude the disease since many sheep will not accept minerals. At *post-mortem* examination the appearances are similar, though there is usually a marked congestion throughout the intestines in hypomagnesaemia. An accurate diagnosis can only be made by chemical examinations of blood samples from about 6 comparable members of the flock. The injection of magnesium compounds in clinical cases does not always produce much response.

The other anaerobic infections always have to be considered, but with the exception of struck, their diagnosis presents relatively little difficulty.

Struck is also an enterotoxaemia but associated with *Cl. welchii* type C. Suggestive *post-mortem* lesions are excessive peritoneal transudate and inflammation or even ulceration of the intestines, but final confirmation depends on the demonstration of the specific toxin in the intestines or peritoneal fluid.

Lamb dysentery rarely affects lambs after the first 2 weeks of life. There is a marked haemorrhagic enteritis usually with multiple ulcers, and the specific toxin of *Cl. welchii* type B is relatively easily demonstrated.

Braxy appears to be much less common than was formerly believed, but it may be that many deaths attributed to it were in fact due to enterotoxaemia. It usually attacks yearling sheep during the frosts of the autumn or winter months causing sudden deaths. An early *post-mortem* examination may show marked inflammation of the abomasum but putrefaction is very rapid and laboratory diagnosis impossible after a very few hours. The demonstration of *Cl. septique* in the stomach wall is easy but of indefinite value.

Black disease is constantly associated with liver fluke infections and is, therefore, usually seen in sheep during late autumn and winter. The *post-mortem* picture particularly some time after death may resemble enterotoxaemia though there are also areas of necrosis in the liver. The toxins of *Cl. oedematiens* can be demonstrated most readily in fresh peritoneal fluid.

It seems most probable that certain other diseases can help to precipitate enterotoxaemia. Thus, the author in the examination of 133 lambs which died severely parasitised by Nematodirus worms, found 36 showing *post-mortem* lesions resembling enterotoxaemia and toxin was demonstrated in 19.

Lambs will nibble basic slag from dressed pastures and this chemical can sometimes be found in considerable quantities in their stomachs. Sudden deaths may occur and toxin can frequently be demonstrated in the intestinal contents.

The clinical appearance in both these syndromes does not wholly resemble enterotoxaemia but it seems likely that such factors may play a part in the production of toxins.

Control

Because of the factors already outlined it is possible to reduce losses to some extent by management methods. The avoidance of sudden changes in feeding, and removal from lush pasture once an outbreak has commenced are both useful. However, it is obviously advantageous to keep sheep in good thriving condition and to make maximum use of rapid growing leys. Consequently stimulated artificial immunity is highly desirable and good economic practice.

Two methods are available:—

Specific anti-serum has the advantage that it gives immediate protection and can be used to cut short an existing outbreak. However, the protection only lasts for about 3 weeks and though it is possible that during that period contact with the bacteria may lead to some active immunity, it is a relatively expensive method of control.

Serum and vaccine can be used simultaneously at different sites with a second dose of vaccine given 4 to 6 weeks later. This method gives immediate protection and ultimate prolonged active immunity.

Vaccines usually consist of lysed *Cl. welchii* type D organisms and the specific toxoid alum-precipitated. Two doses are needed at an interval of at least 4 weeks to give a good measure of immunity in all sheep, but this active immunity then lasts at least 6 months. A further single injection at any time after that period rapidly raises the level of immunity. It has been shown by Batty, Thomson and Hepple (1954) that recently vaccinated ewes can transfer protection to their lambs through the colostrum giving them protection up to a month.

It is thus possible to work out a scheme which will give maximum protection to the whole flock at the peak periods of incidence and to cover the lambs until they can be actively immunised. Such a scheme is suggested in the following table:—

Sheep not previously vaccinated	Sheep vaccinated before	Lambs
January (mid pregnancy)		April (4 weeks old)
February (late pregnancy)	February (late pregnancy)	*May (8 weeks old)
		August (if to be kept on)

(*This injection may be delayed for late lambs which will not be 8 weeks old until after the peak seasonal incidence).

Possible Hazards

Any vaccine which contains alum adjuvant can, if carelessly used, give rise to abscess formation. A few such cases have been investigated by the author and were generally associated with vaccination carried out in wet weather.

The choice of site of injection is important. It is generally considered that a site over the ribs a few inches behind the shoulder blade is the most accep-

(*Concluded overleaf*)

Thoughts on the Veterinary Surgeon and the Community

BY

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COMMENTS made by Sir William Slater in the second of his Share-Jones lectures have stimulated me to express some of the thoughts which have occurred to me as a result of the opportunity to look at overseas farming methods. In particular, Sir William Slater comments on the increasing complexity of the work of the stockman. He also says "that many new techniques and treatments are of little value if they are not put in practice by men with a full understanding of what is involved. Every step we take forward towards higher food production to meet the world's growing population must inevitably increase the stress put on our farm animals. These stresses push the animals nearer to the degree of abnormality which we recognise as pathological and the margin of safety is reduced. Only a well trained and skilled stockman who understands what is happening in an animal can be expected so to handle his stock that the safety limit is not exceeded. I end this lecture therefore, as I did my first with a plea for greater technical training for men working on the farms. Whatever we do in the laboratory, on these men must rest the burden of keeping our stock healthy and productive."

It seems to me that Sir William Slater has placed his finger on the potential weakness in the interpretation and use of agricultural research. The actual handling of animals in this country is still largely in the hands of relatively scientifically untrained men. Because of their interest however in their stock, many stockmen readily assimilate knowledge if it is given to them in a graphic and simple form. The most successful method of passing on such information is by discussion and demonstration. After all, it takes 5 years to train a veterinary surgeon, yet a stockman is expected to have at least some ideas on the recognition of disease plus the ability to feed animals, house animals, and also in many cases look after the growing of food crops. If the tempo of agriculture is continually speeded up, it will be impossible to prevent great wastage of animals because of the relative ignorance of the animal handlers. It is necessary therefore, to consider what part the veterinary surgeon can play in the improved education of stockmen.

The veterinary surgeon in 1959 plays many parts in the community, and his work takes a different emphasis depending on the client and the animal.

To the small-animal owner, the veterinary surgeon frequently carries the status of a medical practitioner. His work can have a high sociological value in a community which values dogs and cats as part of the domestic background. It is impossible, in many cases, to place a commercial value on a treatment which may save the life of such a domestic animal. Therefore, if this work is to be successful, it is essential to emphasise its professional aspect, so that the owner has complete faith in the integrity of the veterinary surgeon, and the knowledge that he will practise his skill without too much thought of the eventual cost of the treatment.

Enterotoxaemia—*Concluded.*

table. If the fleece is parted carefully the skin beneath is usually clean, in distinct contrast to the wool-free areas of the thigh. The use of this site does not involve tipping the sheep and if, by misfortune, an abscess arises it does not interfere with the animal's walking, it is separated from vital tissues by the ribs, and the permanent damage is in a less valuable part of the carcase. It is easier in this site than in the wool-free areas to stick the needle in and out again through the skin depositing the vaccine in the wool. Care is necessary to avoid this on all occasions, and a painful method of prevention is to place a finger over the site of re-emergence!

It is not considered necessary or practicable to disinfect the skin before injection.

There appears to be no direct danger in the use of vaccine in heavily pregnant ewes even to within 2 weeks of lambing, though care must, of course, be taken with their physical handling.

Elementary precautions such as frequent changes of needle and syringe should be observed when large numbers of sheep are inoculated and half-used bottles should not be stored for later use.

The author has encountered a single case where lambs injected correctly with a commercial vaccine died within a few minutes. This was believed to be due to an anaphylactic phenomenon probably associated with transferred maternal antibody. Serum injections, particularly if repeated, might be expected to give rise to such phenomena, but this in fact must be very rare and has not been encountered by the author.

References

BATTY, IRENE, THOMSON, A., & HEPPLE, J. R. (1954). *Vet. Rec.* **66.** 249.

BENNETTS, H. W. (1932). *Bull. Counc. Sci. Industr. Res., Australia.* No. 57.

BULLEN, J. J. (1952). *J. Path. Bact.* **64.** 201.

———, SCARISBRICK, R., & MADDOCK, A. (1953). *Ibid.* **65.** 209.

———, & BATTY, IRENE (1957). *Ibid.* **73.** 511.

———, & SCARISBRICK, R. (1957). *Ibid.* **73.** 495.

GILL, A. A. (1933). "Pulpy Kidney Disease of Lambs." Research report by N.Z. Department of Agriculture, Wellington, New Zealand.

OXER, D. T. (1932). *Pamphl. Counc. Sci. Industr. Res., Australia.* **35.** 9.

In all other fields of veterinary work, treatment and diagnosis is associated very closely with the economic value of the animal—whether it be a racehorse or a valuable dairy cow.

Because of this marked difference in approach it has occurred to me that the profession may be wrong, in the agricultural field in particular, in placing undue emphasis on the professional aspect of the work. Although the day-to-day treatment of animals will always be an important part of the work of the country veterinary surgeon, I consider that there is a field which is still largely unfilled by the veterinary surgeon, that is the extension of research knowledge on animal disease control to the farmer.

In these days when the advances in pasture management, breed improvement, and disease control are relatively rapid, much has still to be done to ensure that the farmers are actively aware of the problems to be encountered, when animals are housed and fed more intensively. There are many sources of advice open to the farmer both from the government advisory services and commerce, but it is obvious from the serious losses that do still occur from such conditons as liver fluke, hypomagnesaemia, worm infestations, pregnancy toxaemia, etc., that as a profession we have not ensured that our knowledge is sufficiently widely known.

Although the profession has played a major part in the eradication of tuberculosis and in the control of *Br. abortus*, there are still many fields in which the losses from controllable disease are high.

In the consideration of extension work, whether it be on animal disease or general agriculture, it is essential to be fully aware of the capabilities of the eventual recipient of the information—the farmer. We use the term farmer to describe a man who owns or rents land to grow crops or raises animals, but we often forget that like other members of the community, he varies immensely in his educational background and his ability to assimilate knowledge. I think it is correct to say that many farmers will not assimilate knowledge from the written word or even from a film, and therefore practical demonstrations of new methods of disease control are frequently necessary.

It is impossible for the veterinary services as they exist to-day to be in touch in an active manner with more than a small percentage of the farming community at one time. This means that disease control lessons are frequently learned the hard way, *i.e.* after a severe disease loss has occurred on a farm.

In the U.S.A. where in the light of the rapid developments in veterinary and other sciences the importance of extension work is recognised, this problem is handled by a special department of the State agricultural universities. The State agricultural research services are responsble for the supply of research results to field extension officers, who then interpret these results often directly on to a man's farm. This research work is interpreted to the farmer in various ways by means of lectures, films, pamphlets, television and wireless, and field demonstrations. In every case the extension work is co-ordinated so that the maximum response is obtained from each programme.

In this country, the animal owner, *i.e.* the farmer, receives relatively little educational contact from the profession as a whole except on individual problems. Many farmers receive no more than normal school education, and therefore are dependent on acquired experience and their knowledge of local conditions to farm successfully, but this is not enough in 1959. It is inevitable therefore, that many bad farming practices are perpetuated, and in other cases farmers, because of lack of knowledge, waste good animals. Although there are now many agricultural colleges, the information supplied on veterinary matters even at the best of these colleges is very limited.

It is my opinion that the profession as a whole would gain immensely and simplifiy its eventual work on the individual animal if veterinary field extension services were extended.

In Australia, market days, sales, etc., are considered the ideal opportunities for the supply of field extension information. On such days it is usual to talk to the assembled farmers on animal disease problems, frequently the talk is accompanied by films, foot-rot demonstrations or a *post-mortem*. In this way, farmers learn as a group and assimilate knowledge in a way which does not occur if the teaching takes place during a normal veterinary call. The busy practitioner has little time for discussion during his normal working day. Too often also he has to treat an animal for a condition, which will probably recur on the farm, because there was not the time to discuss its prevention by a change in animal management methods.

A veterinary extension service could initially be attached to the veterinary colleges, and the recognised A.R.C. stations. In this way its officers would have access to research findings and would be aware of the local interpretations of disease problems. Although the actual area of Great Britain is small, the disease problems encountered in Devon for example are frequently very different from those encountered in the south-east of England. Extension work therefore has to have a local application.

Some comments made in New Zealand and Australia are of particular interest in their reference to extension work.

I think that they both have an application to this country and point to some of the important aspects of education of the farmer.

New Zealand

Mr. D. M. Smith, a research worker in pig husbandry, in his presidential address to the Annual Conference of the New Zealand Society of Animal Production said:—

"As a research worker and as a member of the community, I cannot remain disinterested in the fact that the knowledge that I and my colleagues past and present, have garnered, remains largely unused and unapplied, misinterpreted or wilfully ignored.

"I refuse to believe that it need be an accepted principle of research and extension work that in this

day of modern means of communication—radio, films, farmers' conferences, the press and farm journals that there must be a time lag of as much as 20 years between the enunciation of a principle and its application to the farming industry.

"Some classes of research work have been readily accepted and applied. These include the use of antibiotics for mastitis, cobalt for cobalt deficiency in sheep, new methods of housing for pigs, etc. These measures, however, were obviously necessary and the remedies therefore had an immediate appeal. It is obvious that in some cases research workers appear to be incapable of putting their results over to the public without getting bogged down in a lot of technical jargon that nobody can comprehend. Research workers are therefore not without blame in hindering the extension and application of their findings by explaining them in an obscure fashion.

"In New Zealand the most effective farm advisory work has proved to be that of the Dairy Board consulting officers, where the adviser deals with all phases of the production and economics of the farm. Because of this, they have an extremely close personal contact with the farmer as an individual and they are often aware of the financial situation of the farmer and so know whether he can afford to invest money in drainage, a new cow shed or a new piggery, etc. Because of this close contact and the knowledge of the farmer's financial position and resources, it is essential that successful extension work should be divorced from government departments.

"The average farmer is not keen to divulge his financial income and outgoings to a government servant as he suspects that any government servant is related in some way to the income tax authorities."

Mr. Smith said that one of the failings of the existing extension service was that they did not consider the farmer as a person possessing all the foibles of human nature; also, he considered it to be of particular importance that the agricultural research worker in presenting his results should, where possible, show where they apply to the industry. He should explain the modifications to normal practice which their application involves, and indicate their possible economic repercussions.

In conclusion, Mr. Smith remarked that he was convinced that the only way in which extension work could be successful is for it to be related closely to the agricultural colleges. If this were done he felt that it would lend a realism to agricultural teaching and it would ensure that factual information was continually being obtained on farm economics.

Australia

An interesting experiment is being carried out in Australia under the supervision of Professor Baker of Canada, who is a rural sociologist. Professor Baker's idea is that the best way to solve the agricultural and other problems of a community is first to obtain a picture of what the local farming community consider to be their major problems. He feels that too often research projects are carried out without the establishment of close relationships with the farming community which may benefit from the research findings, so that often there is a time lag in the appreciation of research by the end user.

The first object of Professor Baker's work in Australia was to arrange meetings throughout the agricultural area in which he was interested, so that a picture could be obtained of the problems which were considered important by the local residents. As a result of these meetings, discussion groups were formed to discuss the main agricultural problems.

Naturally, as this meeting was held in Australia, one of the most important problems to be faced was the control and utilisation of water. Other problems which were discussed were soil surveys, determination of fertiliser requirements, the use of the best farm machinery for that particular soil and area, the weed and insect pests likely to be encountered on crops and local animal disease problems. As a result of the meetings it was possible to arrange for the setting up of experimental plots and experimental groups of animals in each communal area, so that the farmers themselves could play an active part in the investigations and were encouraged often to support the experiments financially.

Although the approach to the problem of research is different in the two countries, one can sense that there is a feeling that research findings are frequently wasted because the end user, *i.e.* the farmer, is often unaware that the work has been carried out or he is unable to appreciate that it may be of value on his farm.

In this country, extension work on all aspects of poultry and pig farming is of a high standard but there are still many gaps in the supply of information to the cattle and sheep farmer. As the object of the sheep and cattle farmer is to produce healthy animals capable of producing milk, meat or wool in an economic manner, it is essential that extension information must cover disease control as well as information on nutrition, housing, land improvement, etc. I feel that the veterinary surgeon could play a leading part in this extension work as over the years he has built up close contact and confidence with the dairy farmer, beef breeder and sheep farmer.

The annual conferences held with nutrition workers and the feed manufacturers is a beginning, but these meetings must be extended into much more active extension work on the farms, as nutrition, disease control and farm management are one.

How often is the veterinary surgeon called in to treat pregnancy toxaemia in the spring, when extension work during the autumn and winter could have reduced the danger of losses.

Treatment of liver fluke in the spring, could be avoided by extension discussion in the autumn on control. One could enumerate many other disease problems which should be handled in a similar way. The Veterinary Investigation Officers and veterinary practitioners called in to investigate animal loss, must often be amazed at the ignorance of the farmer.

(*Continued at foot of adjoining column*)

Current Literature

ABSTRACTS

Chronic Uraemia in Dogs : Current Concepts. GUILD, W. R. (1959). *J.A.V.M.A.* **134.** 276.

The kidneys are best regarded as millions of individual functional units, the nephrons, and it is the number of these functioning healthy nephrons that makes the difference between renal health and disease. It is not important which part of the nephron is damaged since the end result is failure of the nephron as a unit. In man it is the glomerulo-tubular apparatus which is primarily damaged, whereas in the dog the interstitial tissue bears the brunt of the initial attack.

Despite the fact that the kidney has very large reserves of function, chronic renal disease eventually leads to uraemia but even at this stage the nephron has remarkable capacity to adjust to its disturbed functions of excretion and resorbtion. Uraemia arises following the retention of the end products of nitrogen metabolism in the body. These end products can be conveniently described and grouped as " osmols."

Treatment of chronic uraemia should aim at increasing renal function and decreasing the load of deleterious osmols to be excreted daily. Since increasing the sodium intake increases renal function this is the method suggested by Guild, who advocates feeding bouillion cubes each containing 3 g. sodium chloride. The reduction of the total number of osmols excreted daily is effected by decreasing the protein intake.

A. R. J.

Studies on a Disease in Mink with Systemic Proliferation of Plasma Cells. ~~BIGGS, P. M.~~ (1959). *Amer. J. vet. Res.* **20.** 384.+ 93, A. Obel

Dr. Obel describes the pathological findings in 36 cases of a disease affecting mink ; some of these were clinically normal but others were submitted for necropsy.

The disease began with plasma cell proliferation in the bone marrow, spleen and lymph nodes. Infiltrations of these cells appeared in the liver and kidneys and finally spread throughout the body. These infiltrations never became macroscopically visible as they do in plasmacytomata in bone marrow in man.

Signs of disturbed protein metabolism were seen in paramyloid deposits and in the occurrence of Bence-Jones proteinuria. There was no sign of any condition which could have stimulated reactive plasmacytosis, and the author therefore concluded that the disease was probably a plasma cell leukaemia. I. W. J.

Infectious Gastro-enteritis of Pigs. GOODWIN, R. F. W., & JENNINGS, A. R. (1959). *J. Comp. Path. & Ther.* **69.** 87.

Ten outbreaks of the disease were studied by the authors. They found the disease to be infectious, with a very short incubation period, and the cause of heavy mortality in piglets. The condition resembles the transmissible gastro-enteritis of pigs found in North America.

The chief symptom is an acute diarrhoea, which is often grey or brownish in colour, with corresponding

+ See Correction - p. 722

Thoughts on the Veterinary Surgeon and the Community—*Concluded.*

on such subjects as liver fluke, worms, pregnancy toxaemia, hypomagnesaemia, etc.

Veterinary extension services do exist at the moment in the form of the V.I.O. centres and the A.R.C. stations, but because of the pressure of day-to-day investigations, extension work is only possible on a relatively small scale.

It is my opinion that as the major animal diseases are brought under control that the major future for the professsion must lie in the field of preventive medicine, and even to-day there is much to be done in the supplying to the farmer of existing knowledge on disease control methods.

A successful veterinary extension policy would depend on the veterinary officer working in very close co-operation with his colleagues from the other fields of agriculture. So many farming problems can only be solved by the elimination of the mistakes that are causing losses on the farm whether they be due to faults in nutrition, housing, or the methods of handling the stock.

This would mean that an extension officer would have to work in close contact with a university which had a strong agricultural faculty, or with a veterinary college or agricultural research station, which was closely related to local agricultural problems.

Ideally, an extension officer should be a man who has had a period of both research and field experience, but in his day-to-day work he must not be tied by the daily routine of either. He should have the ability to express himself clearly, and have a deep interest in farming and farming methods.

There are many areas in Great Britain where such extension services could be developed and already exist to a certain extent, but in most areas they are unbalanced because of the lack of full veterinary understanding.

During the last 6 months, I have heard several speakers with a wide experience of agriculture addressing farming meetings. At the end of the meeting when questions have been asked from the audience, the majority of these questions have been of a veterinary nature. The speakers have dealt with the questions as best they could, but it was obvious that a veterinary surgeon could have dealt with the questions much more fully, and to the greater advantage of the audience.

The problems of disease and agriculture are so complex now that it is impossible for any speaker to deal in any detail with specialist problems.

loss of weight and condition. This leads to debility with great thirst, but symptoms of vomiting are infrequent. In the less severe cases there is some listlessness, with loose faeces having an offensive smell. Sows can be infected a few days before or after farrowing. The diarrhoea in the newly born pigs is lighter in colour than it is in the adult animals, and it often has a green tinge. New-born piglets may be found dead in 1 or 2 days, but pigs between 1 and 2 weeks old may scour for several days before dying. The infection often appears to start in the adult stock on the farm.

On *post-mortem* examination a distinctly pinkish colour of the skin is noticeable, and if the diarrhoea has been severe, some dehydration of the carcass exists. Stomach lesions range from some petechial haemorrhages in the pyloric region, to acute inflammation and ulceration. The intestine shows haemorrhagic enteritis, with inflammation of the jejunum. The kidneys have sub-capsular petechial haemorrhages, or else are paler than normal, and contain urates. There is some evidence of an encephalitis present, and the blood vessels of the cerebellum in particular are very congested with blood cells, both red and white. D. J. A.

The Occurrence of Inclusion Bodies in the Circulatory Neutrophils of Dogs with Canine Distemper. BIGGS, P. M. (1959). *Cornell Vet.* **49.** 127.

The authors report the discovery of inclusion bodies in the circulating neutrophils of dogs affected with distemper. By means of fluorescent antibody studies the inclusions were shown to contain specific viral antigen. Schoor's stain showed them as homogeneous red, round, oval or irregularly shaped bodies, 1 to 4 microns in diameter, affecting from 2 to 68 per cent. of the neutrophils. Similar bodies were found in the young cells of the neutrophilic series in the bone marrow. This suggests that the cells are infected as they develop in the marrow, and that they carry the inclusions out in the circulation to any tissue to which neutrophils are attracted. The virus is then released wherever the cells are destroyed. I. W. J.

The Experimental Reproduction of Enterotoxaemia in Piglets. FIELD, H. I., & GOODWIN, R. F. W. (1959). *J. Hyg.* **57.** 1.

This paper is concerned with the experimental reproduction of *Clostridium welchii* type C enterotoxaemia in the progeny of sows drawn from a herd in which natural outbreaks of the disease were occurring.

The disease in its typical form was readily produced by giving piglets meat broth cultures of *Cl. welchii* type C, by mouth, within 5 hours after birth. Piglets dosed 40 hours after birth were much more resistant to infection. The disease was rarely produced by the oral administration of washed bacteria but it was fairly easily produced by bacteria-free filtrates of meat broth cultures, *i.e.* by toxin alone, piglets dying after being given this material by mouth exhibiting all the extensive pathological lesions seen in the natural disease. The examination of the intestinal contents of these piglets revealed that they contained far greater amounts of toxin than that which had been administered by mouth. An interesting observation was that the contents were also found to contain *Cl. welchii* type C organisms, these organisms not usually being found in control untreated piglets. A possible explanation put forward by the authors to account for this and for the subsequent development of the disease is that the intestinal contents of the piglets initially contained small numbers of type C organisms not demonstrable by their techniques and that the toxin given by mouth, aided perhaps by the peculiar free permeability of the gut wall shortly after birth, produced a small area of necrosis in which the type C organisms were able to proliferate. The advent of further toxin then cumulatively repeated the process until much of the intestinal lining was destroyed and the ensuing large quantities of toxin overwhelmed the piglet. H. W. S.

Salmonellosis in Northern Ireland, with Special Reference to Pigs and Salmonella-contaminated Pig Meal. NEWELL, K. W., MCCLARIN, R., MURDOCK, C. R., MACDONALD, W. N., & HUTCHINSON, H. L. (1959). *J. Hyg.* **57.** 1.

The object of this work was to determine the relationship between the high contamination rate of animal protein supplements of pig food and salmonella infection in the pig. The principle of the investigation was to examine the caecal contents of pigs freshly slaughtered at an abattoir and, if Salmonellae were found, to endeavour to trace the infection back to the herd of origin, the food of origin and, if possible, the ingredients of which the food was composed.

The abattoir examination was conducted in two series. In the first, Salmonellae were found in caecal swabs from 4 of 389 pigs and, in the second, in 6 of 100 pigs. The examination of caecal contents in addition to caecal swabs in the second series raised the isolation figure from 6 to 23, an increase that was considered possibly to be related to the greater volume of faecal material examined. Salmonellae were isolated from the meat of only 1 of 30 pigs examined from this group.

Five farms whose pigs had been found at the abattoir to be infected with Salmonellae were visited. There was no history or evidence of clinical Salmonella infection amongst the pigs or the other animals kept on them. However, on 2 of the farms the Salmonella types that had been found in their pigs at the abattoir were also found in rectal swabs from pigs present on the farms at the time of the visit. On one of them, the same Salmonella type was also found in the pig meal and in the fish meal which formed its main animal protein constituent. On another farm, the Salmonella type isolated from its pigs killed at the abattoir was not found in the faeces of pigs kept on the farm but it was found in their pig meal. On the fourth farm similar Salmonella types were found in rectal swabs of the resident pigs, their pig food and its animal protein constituents; these types were different from the one present in the abattoir pig that originated from this farm. No Salmonellae were found on the fifth farm in either the pigs or their food.

The authors consider it probable that some Salmonella types pass from feeding-stuffs through pigs to human food and thus give rise to infections in human beings. They recommend that the sale in Northern Ireland of animal feeding-stuffs, such as Angola fish meal, that are known to be heavily contaminated with Salmonellae should be prevented. H. W. S.

† See Correction - p. 722

The Victoria Veterinary Benevolent Fund Ladies' Guild

The 28th annual general meeting of the Ladies' Guild was held in the Metropole Hotel, Folkestone, on 4th September. The President, Mrs. Alex Thomson (Beckenham) was in the chair.

Mesdames Glover (hon. treasurer), Wright, Cook, Claxton, Ritchie, Pugh (L. P.), Chadwick, Ingram, Wooldridge (W. R.), Weipers, Bell, Luke, Scott, Barclay, Holman, Rosborough, Robertson, Lloyd, Simcock, Graham, Jennings, Chapman, Anderson, Pugh, Davies, Graham, McKeller, Denholm, Oliver, Corrigall, Laing, Thomson, Hebeler, Field (hon. sec.), and Miss Pugh signed the attendance book.

The President, after extending a warm welcome to all present, spoke of the loss the Ladies Guild had suffered by the death of Mrs. W. E. Jones, Bettws-y-Coed, a former secretary, and active member of the North Wales Division. Members stood in silence for a few moments as a tribute to her memory. An apology for absence and good wishes to the Guild was received from Mrs. G. H. Wooldridge.

The Minutes of the 1958 annual general meeting were read, received *nem. con.* and signed by the President. There were no matters arising.

Correspondence

During the year letters were received from:— Dr. F. Bell, intimating his willingness to act again as hon. auditor. Mr. Francis, asking for information. Mme. Godéchoux, President of the Association Française des Femmes de Vétérinaires. Mr. Dawes, on the subject of representation of the Ladies' Guild on the Council V.V.B.F.

Annual Report

The hon. secretary, Mrs. Field, reported as follows:—

The year now ending has been a very active one for many members of the Ladies Guild. Two new Divisions have been formed, one in the S. E. Midlands and one in Herts. and Beds. and our hon. treasurer now has a collector in Lincolnshire.

At the beginning of July, I wrote to the representatives of 16 Divisions and received 13 replies, since these replies form the basis of my annual report I am most grateful for their news and for the nominations for next year's President. Here I would like to point out that any member can make a nomination for President and the member nominated need not be a member of any particular Division. According to rule 11 of the Articles nominations should be sent to the secretary at least one month before the annual general meeting, as also should any resolution to be considered and discussed. I propose now to give you briefly news from the Divisions.

From the North of Scotland Mrs. Service writes that a dance and raffle held last December was both enjoyable and financially successful. Mrs. Kennedy of Dumfries and Galloway helped by Mrs. Fleming and Mrs. Howatson organised a successful dance and has arranged to hold a dinner/dance at Lockerbie House Hotel on November 20th next. From the Scottish Metropolitan Division Mrs. Anderson sent news of a dance held in Edinburgh. This division is making a great effort to increase its membership. Mrs. Wilson, with the help of the ladies of the Ayrshire Division, organised the annual dance. This winter they are hoping to arrange one or two meetings concurrently with meetings of the Ayrshire Division of the B.V.A. Mrs. Forbes Ritchie of the Midlands Division and Mrs. Baird of the Lancs. and Yorks. Division find it difficult to interest members in social events, but Mrs. Ritchie reported an increase in subscriptions and donations after the circulation of the list of beneficiaries. Mrs. Rosborough, chairman of the Northern Ireland ladies, sent news of a very active year. Their members arranged a profitable coffee party, had a tombola at their annual dance and a day's outing in the County Down. From South Wales, through Mrs. Camps, comes news of another coffee party, held after a jumble sale arranged by members in Newport. South Wales members have been asked to make individual efforts to raise money this year. The venue of their A.G.M. is to be changed from Carmarthen to Cardiff. One new Division previously mentioned is the South East Midlands. Mrs. Sutton writes that their first dance, held in Northampton last March, was so well attended that they intend to hold another next March. The Central Division had nothing to report, but Mrs. Reid says that Mrs. J. N. Ritchie organised a very successful dance at Tolworth. The Ladies Guild in Dublin (Eire) held a raffle at the veterinary students annual dance and Mrs. Lowndes hopes to arrange another raffle in the autumn. In the Eastern Counties the students of the Cambridge Veterinary School contributed a short cabaret to a dance held in Cambridge in May. Mrs. Lloyd is secretary of our newest division, the Beds. and Herts., and has arranged a dance to take place in Bedford on October 8th. The demand for tickets is very encouraging. I am sure that we all wish them a very happy and successful evening.

It is now my pleasure to thank our President for all her hard work during her year of office, particularly in making all the arrangements for what the President, B.V.A. (Mr. Hebeler) pronounced to be one of the best of all the Ladies Guild dances. You all, I hope, heard the tribute our President paid at the dance to our hon. treasurer, Mrs. Glover. We are extremely lucky to have her and I take this opportunity of saying thank you to her for all her help during the past year. I would also like to thank Mr. Mitchell, Editor of THE VETERINARY RECORD, for being very co-operative in publishing our minutes, Mr. Francis, secretary of the V.V.B.F., and Dr. Bell, our hon. auditor.

Hon. Treasurer's Report

In thanking the President for the tribute which she had paid her, the hon. treasurer said that a happy team made work easy and she thoroughly enjoyed it. She then presented her balance sheet for the year

and thanked everyone who had contributed in any way to the record total of £1,393 4s. 3d. After some discussion as to how this amount should be divided, it was resolved that £1,000 be allocated for current relief and £300 to the special gift fund. This was proposed by Mrs. Alex Thomson of Glasgow and seconded by Mrs. W. R. Wooldridge.

President's Address

The President began by thanking members for electing her to the chair last year. She said that she was grateful for the experience of representing the Guild on the Council, V.V.B.F. She was so interested that she never missed a Council meeting and was amazed at the time spent discussing each case. She supported the suggestion for a more permanent representative. She thanked Mr. J. N. Ritchie for acting as M.C. at the dance on Tuesday night and Mr. Alan Wright for his help with the tombola, and also took this opportunity of thanking the many firms who gave prizes and Messrs. Burroughs Wellcome and Co. for the programmes. The profit on the dance should be about £350. The President thought that one meeting a year was not enough now that the Guild is so flourishing, and suggested that an interim meeting be held in London at the time of the Small Animal Congress. She thanked the hon. treasurer and hon. secretary for their helpful co-operation during her year of office.

Before proceeding to the election of officers for the ensuing year, the retiring President said that the secretary had received two nominations for President, Mrs. Alex Thomson of Glasgow and Mrs. Mitchell of Edinburgh. The Secretary had written to both ladies but no reply had been received from Mrs. Mitchell, who was in Canada. Mrs. Thomson gave reasons for preferring not to accept office again at this particular time. She said, however, that in the event of Mrs. Mitchell feeling unable to accept office she would do so. It was proposed and seconded that Mrs. Mitchell be President for the coming year if she were willing to accept office, and if not, that Mrs. Thomson be elected.

Election of Officers

President: Mrs. Mitchell, Proposed: Mrs. W. R. Wooldridge, Seconded: Mrs. J. N. Ritchie. *Hon. Treasurer:* Mrs. Glover, Proposed: Mrs. A. Wright, Seconded: Mrs. L. P. Pugh. *Hon. Secretary:* Mrs. Field, Proposed: Mrs. Hebeler, Seconded: Mrs. Lloyd.

Other Business

The meeting then discussed the letter from Mr. Dawes. He pointed out that as the Ladies Guild President holds office for one year only there is lack of continuity of representation on Council, V.V.B.F. He suggested that the election of the hon. secretary would overcome this. It was found on referring to previous Minutes that the first representative of the Guild on Council was the then secretary, and there was no mandate stating that the President must be the representative. It was pointed out that it is often difficult and sometimes impossible for the President to make the journey to London for Council meetings. Mrs. Alex Thomson, Beckenham, proposed and Mrs. Claxton seconded, that the secretary be elected representative of the Ladies Guild on Council, V.V.B.F. and this was carried.

At the request of members, the secretary was asked to arrange a meeting during the period of the Small Animal Congress in London in the spring.

THE HARKNESS FELLOWSHIPS OF THE COMMONWEALTH FUND

The Commonwealth Fund is an American philanthropic foundation endowed by the late Mrs. Stephen V. Harkness and the late Mr. and Mrs. Edward S. Harkness. All Fellowships are tenable in the United States and are offered—in separate series—to candidates from the United Kingdom, Australia and New Zealand, and Western Europe. Thirty Fellowships are offered in 1960 to candidates from the United Kingdom, under the following conditions of eligibility, selection, and tenure.

Eligibility

1. Awards are restricted to British subjects who are citizens of the United Kingdom and Colonies by birth or by naturalisation. In the final selection, candidates are required to attend an interview with the Committee of Award in London in March 1960.

2. Candidates may be men and women in any profession or field of study, whose training, experience and intention fall within one or other of the following three groups :—

(A) Recent graduates, or graduands, of universities in the United Kingdom who are completing academic studies and are preparing to enter non-academic careers or vocations.

(B) Graduates of universities in the United Kingdom with some 2 to 4 years' experience of post-graduate study who wish to continue their research or investigations in the United States with a view to an academic or other professional career in the United Kingdom or a Commonwealth country.

(C) Men and women with experience—not normally exceeding 7 years—in public service, the professions, the creative arts, journalism, branches of business or industry, or other comparable careers and vocations. Candidates should have a degree from a university in the United Kingdom, or the equivalent of a degree in qualifications conferred by professional bodies or an attested level of professional accomplishment.

3. No formal age-limits are set, but within the groups indicated in paragraph 2 preference will normally be given to younger candidates.

4. No one is eligible who has already worked or studied in the United States for more than a few months.

5. Candidates selected for interview by the Committee of Award may be required to undergo medical examination. Confirmation of all Fellowship awards is conditional upon the grant of an Exchange Visitor Visa by the U.S. Consular authorities. The issue of this visa is conditional upon a successful health examination.

Information and Applications

Further information and application forms may be obtained from the Warden of Harkness House, London. Applications, typed and in duplicate, should be submitted on the prescribed forms, to reach the Warden of Harkness House, London, before December 1st, 1959. Applications cannot be accepted after this date.

News and Comment

PREMIUM BOARS SCHEME

As from October 1st, 1959, the Pig Industry Development Authority will assume full administrative responsibility for the Premium Boars Scheme as well as the financial responsibility which the Authority undertook on April 1st, 1959. From October 1st, 1959, therefore, any enquiry regarding the scheme should be addressed to the Authority at PIDA House, Ridgmount Street, London, W.C.1.

THE JOINT MEASUREMENT SCHEME

Since our last report two further objections under this Scheme have been dealt with.

The first objection took place at the Annual Pony Club Show of the South Devon West Branch held at Charston Ferrers. The pony was a 12.2 Show pony, "Downland Gale," which is registered in the name of Mrs. B. Harding and stabled with Miss Dickson of Brixham. As a result of the objection the pony was found to be over-height for ponies not exceeding 12.2 and the objection was upheld.

The second was a 12.2 jumping pony called "Duchess" belonging to Mr. T. Holmes of East Stanley, Co. Durham, and was objected to at the Felton Show, Northumberland. In this case the pony's height was found to be exactly 12.2½ with shoes and the objection was therefore overruled.

UNIVERSITY NEWS

Liverpool

Faculty of Veterinary Science
Ordinary Degree of B.V.Sc.

Fitton, J., and Vivian, J. S.

Degree of B.V.Sc., First Examination
Part I (Chemistry)

Akpokodje, J. U., Markusfeld, O.

Part II (Physics)

Markusfeld, O.

Part III (Botany)

Markusfeld, O.

Part IV (Zoology)

Markusfeld, O., Na'isa, B. K.

Third Examination
Part I (Pharmacology)

Carter, D., Love-Jones, H., Smith, B. J., Waugh, I. R., Weinberg, R.

Edinburgh

The undermentioned candidates have passed in the subject of Physics of the First Professional Examination for the degree of Bachelor of Veterinary Medicine and Surgery (B.V.M. & S.):—

Allan, Eleanor J.; Brown, Paul; Buadu, Michael K.; Cameron, Hugh; Doyle, Robert; Gibbons, Robert W.; Green, James C.; Naish, Nicholas G.; Sutherland, Colin D.; Wilson, Alan J.; Yeaman, John.

The undermentioned candidates have passed in the subject of Chemistry of the First Professional Examination for the degree of Bachelor of Veterinary Medicine and Surgery (B.V.M. & S.):—

Allan, Eleanor J.; David, John E.; Douglas, Rodger G. A.; Doyle, Robert; Moody, Eric E. M.; Peele, John C. S.

The undermentioned candidates have passed in the subject of Biology of the First Professional Examination for the degree of Bachelor of Veterinary Medicine and Surgery (B.V.M. & S.):—

Brechin, Robert; Carnegie, David B.; Dobson, Michael C.; Little, Thomas W. A.; Wilson, Alan J.; Yeaman, John.

The undermentioned *external* candidates have passed in the subject of Physics of the First Professional Examination for the degree of Bachelor of Veterinary Medicine and Surgery (B.V.M. & S.):—

Bywater, Robert J.; McLauchlan, James A. S.; Muhammed, Saleh I.

The undermentioned *external* candidates have passed in the subject of Biology of the First Professional Examination for the degree of Bachelor of Veterinary Medicine and Surgery (B.V.M. & S.):—

McLauchlan, James A. S.; Muhammed, Saleh I.; Noble, Frank; Ominiabohs, Florentius E.; Osamor, Christopher A. O.; Taylor, Andrew S.

PERSONAL

Births

BRUNSDON.—On September 4th, 1959, to Jean, wife of John Brunsdon, M.R.C.V.S., of Glastonbury, Somerset, a son, Mark Robert, brother for Paul and Fiona.

HARLEY.—On September 22nd, 1959, to Jill, wife of Peter Harley, M.R.C.V.S., of Devizes, Wilts., a third son.

MARR.—On September 20th, 1959, at "Strathyre," Pinchbeck, Spalding, Lincs., to Sally, wife of Ian C. Marr, B.V.M.S., M.R.C.V.S., a son, Alistair James.

COMING EVENTS

October

7th (Wed.). Autumn Meeting of the Society of Women Veterinary Surgeons at the Guide Dogs for the Blind Association Training Centre, Warwick New Road, Leamington Spa, 2.30 p.m.

8th (Thurs.). Meeting of the Essex Veterinary Society at the Essex Institute of Agriculture, Writtle, Chelmsford, 7.30 p.m.

9th (Wed.). Meeting of the Lincolnshire and District Division at the Berkeley Hotel, Doncaster Road, Scunthorpe, 2.15 p.m.

Meeting of the North of Ireland Veterinary Association at the Whitla Medical Institute, College Square North, Belfast, 7.30 p.m.

Meeting of the Midland Counties Veterinary Association at the Regent Hotel, Leamington Spa, 2.30 p.m.

Meeting of the Mid-West Veterinary Association at the Berkeley Cafe, Clifton, Bristol, 2.30 p.m.

13th (Tues.). Annual Dinner-Dance of the Mid-West Veterinary Association at the Berkeley Café, Clifton, 7.15 p.m.

General Meeting of the Society of Practising Veterinary Surgeons at the Blossoms Hotel, Chester, 7.30 p.m.

14th (Wed.). Meeting of the West of Scotland Division in the St. Enoch Hotel, St. Enoch Square, Glasgow, 7.30 p.m.

15th (Thurs.). Meeting of the Herts. and Beds. Veterinary Society at the Peahen Hotel, St. Albans, 7.30 p.m.

16th (Fri.). Meeting of the Ayrshire Veterinary Association in the Hannah Dairy Research Institute, 2.30 p.m.

22nd (Thurs.). General Meeting of the South Eastern Veterinary Association at the Royal Star Hotel, Maidstone, 2.30 p.m.

24th (Sat.). Meeting of the B.S.A.V.A. North West Region at the Swan Hotel, Chester, 7.30 p.m.

27th (Tues.). Meeting of the Society for the Study of Animal Breeding at the Royal Society of Medicine, 1, Wimpole Street, London, W.1, 11.30 a.m.

Meeting of the Society for the Study of Animal Breeding at the Royal Society of Medicine, 1, Wimpole Street, London, W.1, 11.30 a.m.

28th (Wed.). Meeting of the Dumfries and Galloway Division at Castle Douglas.

November

4th, 5th and 6th (Wed., Thurs. and Fri.). B.V.A. Committee and Council Meetings in London.

B.V.A. COMMITTEE AND COUNCIL MEETINGS IN LONDON

Tuesday, November 3rd—at 7, Mansfield Street

5.00 p.m. Finance Sub-Committee.

Wednesday, November 4th—at 7, Mansfield Street

10.00 a.m. Parliamentary and Public Relations Committee.
11.30 a.m. Farm Livestock Committee.
2.15 p.m. Small Animals Committee.

Thursday, November 5th—at 7, Mansfield Street

10.00 a.m. Veterinary State Medicine Committee.
11.30 a.m. Home Appointments Committee.
2.30 p.m. General Purposes and Finance Committee.

Friday, November 6th—at Connaught Rooms, Great Queen Street, London, W.C.2

10.15 a.m. Council Meeting.

ADDRESSES OF DISEASE INFECTED PREMISES

The list given below indicates, first the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax

Denbigh. Manor Farm, Rhostyllyn, Wrexham (Sept. 28).
Kirkcudbright. Leaths Farm, Castle Douglas (Sept. 22).
Lancs. Linton, Kirkham Road, Freckleton, Preston (Sept. 23).
Midlothian. Gilmerton Dairy, Gilmerton, Edinburgh, 9 (Sept. 28).
Northants. Manor House Farm, Woodford, Kettering (Sept. 23).
Somerset. Batch Farm, Lympsham, Weston-super-Mare (Sept. 25).

Fowl Pest

Cambs. Honey Hill, Fen Drayton (Sept. 26).
Dorset. Higher Farm, Margaret Marsh, Shaftesbury (Sept. 23).
Essex. 4, Wellgreen Cottages, Dry Street, Langdon Hills, Basildon (Sept. 25); Lodge Farm, Colne Engaine, Colchester (Sept. 28).
Gloucs. Hillside, Kingcombe Lane, Chipping Campden (Sept. 25).
Kent. Eastfield Farm, Hawel, Meopham, Gravesend (Sept. 26).
London. 137, Benares Road, Plumstead, S.E.18. (Sept. 27).
Sussex. Corner Farm, Flimwell, Wadhurst (Sept. 23).
Warwicks. 16, Queens Avenue, Shipston-on-Stour; 7, Berry Avenue, Shipston-on-Stour (Sept. 24); 2, Warwick Place, Shipston-on-Stour; Springfield, Shipston-on-Stour; 60, Telegraph Street, Shipston-on-Stour; 15, High Street, Shipston-on-Stour; Pittaway Allotment, Shipston-on-Stour (Sept. 25); Rainbow Farm, Station Road, Shipston-on-Stour; Hanson Farm, Shipston-on-Stour; 18, Darlingscot Road, Shipston-on-Stour; 22, Warwick Place, Shipston-on-Stour (Sept. 26); Greenways, Darlingscot Road, Shipston-on-Stour; 10, Berry Avenue, Shipston-on-Stour (Sept. 27).

Swine Fever

Anglesey. Bone Refail, Marianglas (Sept. 23).
Ches. Woodside Farm, Mottram St. Mary, Prestbury, Macclesfield (Sept. 22); Woodford Hall Cottages, Woodford Lane, Winsford (Sept. 23).
Devon. Curriton Farm, Black Dog, Crediton (Sept. 22); Bury Barton, Lapford, Crediton (Sept. 23).
Dorset. Higher Farm, Margaret Marsh, Shaftesbury (Sept. 23); The Homestead Farm, Holwell, Sherborne; Kinson Lodge, Bearwood, Bournemouth (Sept. 28).
Essex. Park Farm, Thaxted, Dunmow (Sept. 24); 2, Pond Hall Villas, Bradfield Road, Wix, Manningtree (Sept. 25).
Glam. Deri Duon Farm, Capel Gwilim, Thornhill, Rhiwbina, Cardiff (Sept. 28).
Kent. Argrove, Elvington Lane, Hawkinge, Folkestone; Down Court Farm, Doddington, Sittingbourne; Bircholt Court Farm, Brabourne, Ashford (Sept. 22); Hospital Farm, Benenden, Cranbrook; Balls Down Farm, Wraike Hill, Whitstable (Sept. 25); Garden House, Smeeth, Ashford; Haynes Farm, Leigh Green, Tenterden; Luckhurst, Tenterden Road, Woodchurch, Ashford (Sept. 28).
Lanarks. Craighead Farm, Blantyre (Sept. 25).
Lancs. No. 15 Smallholding, Highfield Estate, Levenshulme, Manchester 19; Wharton Hall Farm, Wharton Lane, Little Hulton, Walkden, Manchester (Sept. 23); Marshes Farm, Atherton Road, Hindley Green, Wigan (Sept. 29).
Oxon. Wallowbank Farm, Chipping Warden, Banbury; The Cottage, Balscote, Banbury (Sept. 25); Manor Farm, Shotteswell, Banbury (Sept. 28).
Renfrew. 46, Underwood Road, Paisley (Sept. 25).
Somerset. Orchard Farm, Cockhill, Castle Carey (Sept. 22); Houndsmoor Cottages, Houndsmoor, Milverton, Taunton; The Malt Shovel Inn, Blackmore Lane, Cannington, Bridgwater (Sept. 28).
Staffs. Sunset House, Anslow, Burton-on-Trent (Sept. 25).

FOWL PEST INFECTED AREA

The area described below has been declared to be an area infected with fowl pest, and the movement of poultry without a licence into, within, or out of the area is prohibited.

IN THE COUNTY OF WARWICK

The Borough of Stratford on Avon.

The Petty Sessional Division of Shipston on Stour.

In the petty Sessional Division of Stratford on Avon: The parishes of Old Stratford and Drayton, Binton, Billesley, Temple Grafton, Luddington, Milcote, Clifford Chambers, Weston-on-Avon, Welford-on-Avon, Dorsington, Long Marston, Quinton, Admington, Whitchurch, Preston on Stour, Atherstone on Stour, Alderminster, Loxley and Ettington.

IN THE COUNTY OF GLOUCESTER

The Petty Sessional Division of Campden.

In the Petty Sessional Division of Stow on the Wold: The parishes of Bourton-on-the-Hill, Batsford, Todenham, Moreton-in-Marsh and Evenlode.

IN THE COUNTY OF WORCESTER

The Borough of Evesham.

In the Petty Sessional Division of Evesham: The parishes of Cleeve Prior, North and Middle Littleton, Bickmarsh, Pebworth, South Littleton, Offenham, Bretforton, Honeybourne, Aldington, Badsey, Wickhamford, Childswickham, Aston Somerville and Broadway.

IN THE COUNTY OF OXFORD

In the Petty Sessional Division of Chipping Norton: The parish of Chastleton.

Letters to the Editor

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

SCIENTIFIC

Giardiosis in a Lamb

Sir,—Infestation with the intestinal protozoan flagellate Giardia has been shown to occur in a large number of species including man, but little attention appears to have been paid to its presence in sheep.

Giardia was first reported in sheep by Grassi (1881) and was first associated with disease by Hervé in 1929, reported by Deschiens and Lamy (1946). Turner and Murnane (1932) describe its recovery in Australia in a merino wether which died showing progressive loss of weight, dullness, and anaemia. The authors, however, did not emphasise the pathogenic nature of the infestation and even now the pathogenicity of this species of protozoa is debatable.

So far Giardia has not been reported in sheep in Great Britain and the purpose of this letter is to record its presence in a X Suffolk lamb.

The lamb in question was one of 320 grazing first-year grass which had carried half-bred ewes and ewe hoggs in the autumn. Routine prophylactic anthelmintic dosing was carried out at the end of May, but in July one lamb started to scour badly and was treated with bephenium embonate.* Following this treatment the scour dried up but the lamb failed to recover and was sent to this laboratory for examination.

Clinical examination showed the lamb to be anaemic, dejected with drooping ears and dry wool, and with dried scour soiling the wool of the hind quarters. The belly was tucked up and evidence of abdominal pain was present with continual straining. *Post-mortem* examination revealed a dehydrated carcase with no obvious abnormality other than slight thickening of the small intestine. The rectal faeces were formed into hard mucus-covered pellets, and no worm eggs or coccidia were present.

Wet preparation smears from every part of the small intestine revealed enormous numbers of actively swimming flagellate protozoa which, on detailed inspection and appropriate staining techniques, were shown to have the typical characteristics of the Giardia species. Within 3 hours of the death of the lamb active swimming motility had ceased and identification could be accomplished only by focussing on the stationary protozoan and demonstrating the lazy motility of the flagellae. Sixteen hours later no motile organisms were observed nor was it easy to pick them out on stained smears. Attempts to demonstrate the cystic stage in faecal material were unsuccessful. Histological examination of portions of the small intestine revealed large numbers of the parasite deep down in the crypts with an accompanying eosinophilic reaction.

It is not, of course, possible to state that the Giardias were the cause of the condition in the lamb. In the absence of any other obvious cause, however, and the fact that no marked parasitism was present in the rest of the flock leads one to believe that some pathogenic rôle may have been played by this parasite.

Yours faithfully,
D. W. DEAS.

Edinburgh School of Agriculture,
West Mains Road,
Edinburgh.
September 11th, 1959.

* Frantin; Burroughs Wellcome.

References

DESCHIENS, R., & LAMY, L. (1946). *Ann. Inst. Past.* **72.** 95-103.
GRASSI, B. (1881). *Atti Soc. Ital. Sci. Nat.* **24.** 135.
TURNER, A. W., & MURNANE, D. (1932). *Aust. J. Exp. Biol. Med. Sc.* **10.** 53-6.

GENERAL

Veterinary Services in Saskatchewan

Sir,—My attention has been drawn to a letter appearing in THE VETERINARY RECORD of August 22nd, signed by Mr. J. I. Clark, Agricultural Representative, who gives his address as Maple Creek, Saskatchewan. This letter is asking for applications for a veterinarian in the district of Maple Creek.

I regret to advise you that Mr. Clark has no authority to call for such applications. Any move of this nature should come through the Veterinary Medical Association of Saskatchewan and inquiries should be addressed to the writer of this letter.

Our Veterinary Associations in Western Canada

are having difficulty with such people as Mr. Clark, and we would appreciate it if you would draw to the attention of your profession that any and all information regarding the practice of veterinary medicine in Western Canada will be gladly given by us.

At the present time there is already a veterinarian practising in the Maple Creek district. I note from Mr. Clark's letter that he does not mention this.

I am afraid that some unfavourable publicity has been spread about veterinary medicine in Western Canada, and we are most anxious to have this corrected. With this in mind, please feel free to advise any veterinarian to write directly to myself for any information he might wish to receive.

Yours faithfully,
W. J. TURNBULL,
Secretary-Treasurer and Registrar.

The Veterinary Medical Association of Saskatchewan,
Public Health Department,
City Hall,
Saskatoon,
Saskatchewan,
Canada.
September 11th, 1959.

Treatment of Johne's Disease

Sir,—Following the publication in *The Farmers' Weekly* of my question to the authors of the symposium on Johne's disease—"If you met Johne's disease in the field, what would you do?" and their reply, "We regret we can offer no constructive answer"—it has been represented to me that a spirit of complete hopelessness is portrayed, which was certainly not my intention in asking the question, and I feel sure was not the intention of the panel.

The publication of the question and answer out of its context undoubtedly contributed to this. In my brief remarks I drew attention to the fact that the statistical presentation of Johne's disease incidence as a percentage of the total cattle population in the surveys undertaken tended to minimise the gravity of losses caused by this disease and that this also held when figures of Johne's disease losses were quoted against those of total disposals from our herds. The vast majority of these do not mean that veterinary science could have done little or nothing to cure or prevent the cause of the loss or disposal. The menace of this disease is far better expressed in the words attributed to Dr. Deans Rankin at the meeting of the British Association. "If deaths due to Johne's disease were distributed evenly throughout the year, 3 cows would die of it while I am speaking to you."

For some time I have been aware that in this practice Johne's disease is the biggest single disease factor necessitating slaughter in the knackery or slaughterhouse, and in consequence I was particularly interested in the papers presented, which I felt made a material contribution to our knowledge of the problems involved.

I then said how greatly I would deplore it if the testing of herds, in which clinical Johne's disease existed, by the complement fixation test for Johne's disease antibodies became no longer available to owners who were prepared to apply control measures in the light of existing knowledge.

I agreed that the test could be somewhat confusing when used as a routine herd test for eradication purposes, but that when used as a means of assessing the extent of the problem in herds in which clinical cases had occurred it gives essential information of early diagnosis on which to weigh policy, to guide control measures of husbandry which might reasonably be expected to be of some value in limiting spread of infection, and to plan the more economic longer term disposal of positive animals by slaughter as part of the normal culling policy, and in that way gradually reduce the average incidence within the herd, and yet allow milk production to be maintained at the optimum level possible. It does not imply repeated retesting of such herds.

The test is, I believe, the only practical instrument we have available at the present time on which to base long-term policy within a herd in which Johne's disease has become a problem.

Yours faithfully,
G. N. GOULD.

12, Landguard Road,
Southampton.
September 28th, 1959.

The Colonial Veterinary Services

Sir,—Mr. Marshall's article published on August 29th implies that there is a steady exodus of veterinary surgeons from overseas posts. He concludes that post-war graduates are over-fussy, that the pioneering spirit has diminished and that the job is of secondary importance.

I don't know how Mr. Marshall arrived at his conclusions but I suggest that a critical and detailed analysis would reveal that the matter is not quite so easily dismissed, especially if he consults the individuals concerned. There may be different reasons concerning different territories and perhaps others may care to air their views.

In the case of one territory, which Mr. Marshall mentions, there are about 30 veterinary surgeons filling professional posts. Over the past 3 years about half of them have left the Department and the majority were not post-war graduates but men of long service and experience, with plenty of pioneering spirit. Although many of their posts have been filled they cannot be replaced.

Within the next year or so I believe there will be many more leaving and again it is likely to be the older, more experienced men.

Most people will know that there are rapid and drastic political changes occurring in Nigeria just now and it would be easy to attribute the loss of these men to conditions connected with the events of the time.

Although there are undoubtedly some connexions the difficulties would not have been insurmountable had the Native Authorities received and acted upon first-class advice from their advisers.

However, I believe many of the men who left (and who will leave) would like to have stayed on, irrespective of political changes, had conditions and terms of service been better.

A veterinary surgeon does not have to be overfussy to refuse to stay where salaries are poor and where they compare unfavourably with those of colleagues in the U.K. and even with sub-professional and technical members of his own and other departments, where he is subject to rigid and generally restrictive centralised control, where communications are so poor that letters may take months to produce answers, where he is given little guidance on policy, where he has to spend long hours on office routine and administrative matters, where politics pervade nearly everything. Apart from being posted every few months he may find that the whole Department is subjected to periodical reorganisation throughout.

His professional status is invariably ignored and he may be coerced into getting on to a local register upon which he will find persons not registrable elsewhere.

If the Colonial Office and the Overseas Territories are really interested in getting first-class British graduates they will have to provide proper working and living conditions at a professional level, and we ourselves should also work for the same end. It may not be realised that the status, etc., of our colleagues abroad has an important effect at home, and we cannot afford to be complacent in the matter.

Yours faithfully,

On board R.M.V. *Aureol*. D. G. EARNSHAW.
September 23rd, 1959.

Bone Pinning in a Green Monkey

Sir,—I have recently attempted to pin the femur of a Green Monkey; a high fracture had been sustained from an accident involving a deck-chair. Unfortunately the animal died during the night following the operation, presumably from shock. However, many problems arose, and I should be most interested to hear of any similar work carried out by other members of the profession.

The condition was complicated by the fact that the owner, a simple soul, had taken the animal to a clinic, which shall be nameless, and was assured that the leg was not broken. It was then left, in great pain and not eating, until 8 o'clock on the following Saturday evening (3 days later) when the owner decided that the case was a matter of dire emergency and called me in.

I decided to attempt pinning, but at that time could find no one who had tried the operation on a monkey, and therefore I had no appreciation of the difficulties involved. The animal was premedicated with promethazine hydrochloride* and chlorpromazine hydrochloride,* given pethidine† intramuscularly, and ether was then administered.

The operation proceeded quite well, the muscle bellies parting if anything more easily than in the dog. The pin was inserted through the proximal portion of the bone quite easily, but much difficulty was encountered in locating the distal portion. The callus formation was profuse, the fracture was oblique, and the relative length of the femur resulted in a considerable overlap of bone.

* Phenergan; Largactil. May & Baker.
† Pethidine (Roche). Roche Products Ltd.

The monkey recovered from the anaesthetic within 3 hours, but died during the night, as mentioned above.

It is my opinion that the monkey is such a delicate animal that any major surgical interference of this kind is foredoomed to failure. I should be very glad to hear of any similar cases which might convince me to the contrary.

Yours faithfully,

MOLLY D. FARDELL.

146, Wadham Road,
Walthamstow,
London, E.17.
September 25th, 1959.

Osteodystrophy in Siamese Kittens

Sir,—The parents of two Siamese kittens, the subjects of this report, were brought from Austria on February 27th, 1959, for the required period of quarantine. Both animals appeared to be in good health with adequate bone formation, but no information was available about their diet before entering the kennels. During their stay in the kennels they were fed on the diet which is given to all cats in the establishment, namely, raw horse flesh and water. They were fed once a day at 7 p.m. Each animal was allowed approximately ½ lb. of chopped raw meat per day and each was given water freely. It was fortunate that confinement in kennels made an accurate observation of diet possible, and there were no signs of depraved appetite or unusual behaviour.

On May 2nd two kittens were born. The birth was uneventful and at this stage both appeared to be normal in all respects. They were left with their mother until 5 weeks old. Weaning began at between 3 and 4 weeks of age, and the kittens were weaned on raw meat and water only. On June 8th they were separated from their mother and thereafter their diet consisted solely of raw horse flesh and water; no milk or any other food was given. This diet had been found to be successful for the rearing of other kittens (not Siamese) which had been born in the kennels.

Although the Siamese kittens appeared to grow normally at this stage they were very docile and quiet.

Kitten No. 1. When the kittens were about 7 to 8 weeks old one of them was found to be lame in its left hind leg and examination revealed a fracture near the head of the femur. The animal showed pain when its hind limbs were handled and, supposing this to be the result of an accident, the kitten was treated for a simple fracture but the bone did not heal.

On July 6th the kitten's inability to use both hind legs was noticed. No fracture could be demonstrated in the right leg and no explanation could be found as to the cause of the condition. The kitten appeared fairly bright, with a normal appetite, but it was completely unable to support itself on its hind quarters. The muscles of the hind legs and tail were limp, although a weak pedal reflex was demonstrable.

The animal showed some signs of recovery on July 23rd. It was able to stand on its hind legs and to limp slowly along. On the following Monday, July 27th, however, the kitten became more para-

lysed in the hind regions. The abdomen was distended and the animal appeared to be in pain, but there was no constipation or retention of urine. Death occurred suddenly in the afternoon, 5 weeks after the onset of the condition.

Kitten No. 2. The second kitten appeared to be normal until July 9th when it became unable to bear weight on its left hind leg. The condition progressed rapidly until a few days later the animal resembled its litter mate in being unable to support itself on its hind limbs. No fractures were demonstrable but once again the kitten showed pain when handled. It was fairly bright with a reasonable appetite. The kitten died quite suddenly on July 18th; it did not show any signs of recovery prior to death, the condition having lasted only 9 days.

Unfortunately the body of this kitten was disposed of before a *post-mortem* examination could be performed.

Post-mortem *Examination of Kitten No. 1.* A *post-mortem* examination was carried out on the first kitten the day after it died at the age of 12 weeks. The kitten appeared to be rather stunted for its age but in good bodily condition with a reasonable amount of fat. The abdomen was distended. The alimentary canal, liver, bladder, heart, and lungs appeared normal.

On examination of the limb bones the unhealed fracture of the femur was found in the left leg. There was an impacted fracture at the distal end of the tibia of the right limb with a recent fracture just below the head of the femur which may have occurred just prior to death. There were no fractures of the fore limbs.

The shafts of the limb bones were soft and depressable, suggesting a lack of mineral substance, and the bone could be easily bent. When cut across, the substance of the bone was seen to have been reduced to a thin, parchment-like sheet. The marrow cavity was correspondingly large and filled with a blood-saturated soft tissue.

There was curvature of the spine with an upward displacement of the sacral vertebrae. It is possible that the paralysis of the hind quarters was due to the displacement of the vertebrae with consequent pressure on the spinal cord.

No immediate cause of death was discovered.

It appears from the observations made that the condition seen in these kittens is similar to that described by Henderson and Keywood (1959). As mentioned above, kittens other than Siamese have been reared successfully on a raw meat diet without showing osteodystrophy, so that if dietetic error is one of the aetiological factors of the condition—as suggested by Henderson, Keywood and others—it must be peculiar to the Siamese cat. A study of the origins and idiosyncrasies of the Siamese breed might therefore be interesting in this respect.

In the cases reported above it is known that the sire of the kittens was also the sire of their mother.

The fact that the first fracture appeared so soon after weaning and that later this was followed by an inability to use the hind limbs suggests that the loss of mineral substance from the bone must have started before weaning had been completed, *i.e.* while the kittens were still being supplied with milk by the mother. This would appear to show that the diet given to the kittens after weaning was not the original cause of the condition, though possibly it may have accelerated or magnified some deficiency already present in the animals.

It seems reasonable to suppose that some deficiency, if deficiency it is, already existed in the maternal parent prior to kindling, or that some abnormality of the glands controlling mineral metabolism, inherited or otherwise, existed in the kittens. The maternal parent had been fed exclusively on raw meat and water for 64 days prior to the date of kindling.

However, it seems improbable that the kittens would have been able to support themselves on their hind limbs up to the time of weaning if the state of the bones observed on *post-mortem* examination had existed at birth. This points to the fact that loss of essential substance from the bones must have occurred after the time of birth. Further research into the aetiology, prevention, and treatment of osteodystrophy as seen in the Siamese kitten would seem to be necessary therefore before these various aspects of the condition can be explained satisfactorily.

Yours faithfully,
R. H. FAGG.

University of Bristol.
September 11th, 1959.

References

COCK, E. V. (1959). *Vet. Rec.* **71**. 468.
HENDERSON, G. B. L., & KEYWOOD, E. K. (1959). *Ibid.* **71**. 317-8.
HUMPHREYS, P. N. (1959). *Ibid.* **71**. 381.
JAMES, O. D. (1959). *Ibid.* **71**. 382.
SCOTT, M. G., SCOTT, P. P., & GREAVES, J. P. (1959). *Ibid.* **71**. 382.

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN
Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period		Anthrax	Atrophic Rhinitis	Foot-and-Mouth	Fowl Pest	Sheep Scab	Swine Fever
16th to 31st July, 1959		3	—	—	13	—	57
Corresponding period in	1958	6	—	—	49	—	55
	1957	6	1	9	21	—	38
	1956	26	—	—	34	—	50
1st Jan. to 31st July, 1959		135	—	9	437	—	695
Corresponding period in	1958	102	3	111	371	—	821
	1957	242	6	37	516	—	568
	1956	1,063	8	13	388	—	471